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ABSTRACT

Four competency catalogs of tasks for industrial arts programs are presented. These include catalogs in Metals Technology, Woods Technology, General Industrial Arts, and Industrial Crafts. The purpose of each catalog is to establish a basis for program content selection and criterion levels from which one may measure to see if individual learners have achieved minimal competence. Each catalog begins with an introduction, format description, course description, course goals, and suggested topical outline. The remainder of the catalog is comprised of task statements. Each task follows a typical format that includes the following sections: (1) Area of Competence, which identifies the industrial arts course for which the task was prepared; (2) Content/Concept, which identifies the sub-area with which the particular task is associated; (3) Task, which identifies the knowledge, skills, or attitudes that the learner should possess after instruction; (4) Criterion Referenced Measure, which provides the means of determining whether the learner can successfully perform the task; and (5) Performance Goals, which identifies sub-tasks that lead to the development of the knowledge, skills, and attitudes identified in the task. (LRA)

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woods technology
general industrial arts
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Industrial Arts Education Service
Department of Education
Commonwealth of Virginia
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1979

John M. Ritz David I. Joyner
Project Co-Directors

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PREFACE

In today's complex society, learners need to be prepared to experience situations they will encounter in the future. Consequently, news media presentations have evidenced an intense and genuine concern on the part of government and the citizenry about the quality of American education. Accountability has become an accepted rule in an effort to improve the process of education for the benefit of learners. A national movement to improve education has produced several important developments - among these is Competency-Based Instruction.

Competency-based instruction is a means of education based upon the identification and attainment of prespecified, role-relevant outcomes. To be competent implies that a learner be well qualified and possess certain abilities and qualities within a specified content area. That is, competency based instruction is a system designed to develop prespecified knowledge, skills, and attitudes in learners who are enrolled in an educational program.

Included within this publication are eight competency catalogs of tasks for Virginia Industrial Arts Program. These include catalogs on Architectural Drawing, Basic Technical Drawing, Electricity and Electronics, Energy and Power, Engineering Drawing, Graphic Communications, Metals Technology, and Woods Technology. The purpose of these are to establish a basis for program content selection and criterion levels from which one may measure to see if individual learners have achieved a minimal level of competence through study in a particular course. In this manner a means to improve education and its accountability to the citizenry can be designed based upon the identification and attainment of prespecified outcomes for the industrial arts content area.

A CATALOG OF TASKS
FOR
COMPETENCY-BASED INSTRUCTION
IN

Metals Technology
I & II

Industrial Arts Education Service
Department of Education
Commonwealth of Virginia
Richmond, Virginia 23216
1979

This Catalog of Tasks
Was Prepared At
Old Dominion University
Department of Vocational and Industrial Arts Education
By

John M. Ritz, Project Co-Director
David I. Joyner, Project Co-Director
Lawrence W. Thrasher, Research Assistant

Members of the Advisory Committee
Who Supervised This Curriculum Development
Project Included

David I. Joyner, Co-Chairman, Old Dominion University
John M. Ritz, Co-Chairman, Old Dominion University
Arvid Van Dyke, Virginia State College
Russell G. Louis, Virginia Polytechnic Institute and State University
Charles A. Pinder, Virginia Polytechnic Institute and State University
James A. Jacobs, Norfolk State University
Paul Cummings, Newport News
Peter Fulcer, Loudoun County
Leo Gibbs, Portsmouth

For further information concerning this
competency catalog write to
Industrial Arts Education Service
Division of Vocational Education, Department of Education
P.O. Box 6Q, Richmond, Virginia 23216

INTRODUCTION

In the summer of 1977, The Industrial Arts Curriculum K-12 was introduced. This plan outlined the preferred courses, course sequences, and purposes which should be addressed in Virginia industrial arts programs. However, the model curriculum plan did not establish exact knowledge, skills, and attitudes which all learners should possess as they exit particular programs.

The purpose of the following competency catalog of tasks is to establish a basis for program content selection and criterion levels from which one may measure to see if individual learners have achieved a minimal level of competence through study in a particular course. In this manner a means to improve education and its accountability to citizenry can be designed based upon the identification and attainment of prespecified outcomes for the industrial arts content area. Although this catalog is designed and presented in a sequencial order of task statements, it does not mean that it must be structured into local programs in this order. Individual instructors may choose to restructure the sequence of competency tasks to meet local needs.

In preparing this catalog considerable research and validation was undertaken to specify those minimal tasks which every learner enrolling in the course should be able to perform. The format of this and other catalogs includes the following areas: area of competence, content/concept, task, criterion referenced measure, and performance guides. The area of competence identifies the industrial arts course for which the particular task was prepared. Content/concept identifies the sub-area with which the particular task is associated. The task is the knowledge, skills or attitudes which the learner should possess after instruction in the industrial arts class. Criterion references measures are means to identify if the learner can successfully perform the stated task and finally, performance guides are sub-tasks which lead to the development of the knowledge, skills and attitudes

identified in the tasks. These areas are illustrated in Table 1. It should be noted that performance objectives have been omitted from the catalogs of tasks. This was done to allow individual instructors to develop objectives they see necessary to meet the local learning environment.

In Table 2 is identified the location of this course in the total program of industrial arts for Virginia. Other competency catalogs are contained in this publication and the remaining catalogs may be obtained from the Industrial Arts Education Service, Division of Vocational Education, Department of Education, P.O. Box 6Q, Richmond, Virginia 23216.

FORMAT DESCRIPTION

AREA OF COMPETENCE: Identifies the industrial arts course for which the particular task was prepared.

CONTENT/CONCEPT: Identifies the sub-area which the particular task is associated.

TASK: Identifies the knowledge, skills, or attitudes which the learner should possess after completing instruction in the industrial arts class.

CRITERION REFERENCED MEASURE: The means to identify if the learner can successfully perform the stated task.

PERFORMANCE GUIDES: Identifies sub-tasks which lead to the development of the knowledge, skills, and attitudes identified in the tasks.

TABLE 1

The Industrial Arts Curriculum

Level	Goal	Program
Elementary School	Learning Reinforcement	Industrial Arts activities integrated within the elementary curriculum
Middle or Junior High School	Orientation and Exploration	Exploring Technology Modern Industry Construction Manufacturing
High School	Technical	Communication Technology Materials and Processes Technology Power and Transportation Technology Architectural Drawing Basic Technical Drawing Electricity and Electronics Energy and Power Engineering Drawing Graphic Communications Metals Technology Woods Technology
	Personal Enrichment	General Industrial Arts Industrial Crafts

TABLE 2

METALS TECHNOLOGY I

COURSE DESCRIPTION:

Students use basic metalworking tools, machines and processes to make projects of metal. Students design and plan products which involve the use of lathes, welders, foundry and sheet metal fabrication.

COURSE GOALS:

Experiences and activities of this INDUSTRIAL ARTS course will enable the student to:

1.1 identify examples of how the metals industry directly effects the national economy.

1.2 identify the raw materials needed to make ferrous and nonferrous metals, their sources and how they are transformed into usable products containing certain characteristics.

1.3 apply the process of heat treatment as it is used to improve plain carbon steels.

1.4 analyze and interpret working drawings.

1.5 plan for the production of a metal product or project.

2.1 perform in a safe manner the operations with tools and materials which are needed to produce a product or project of metal.

2.2 use decimal and metric measurements.

2.3 exhibit orderly work habits and show considerations for fellow workers.

3.1 appreciate the knowledge, skills and attitudes of personnel in various phases of metal technology.

SUGGESTED TOPICAL OUTLINE:

I. Introduction to Metalworking

II. Material Characteristics

III. Planning and Layout

IV. Sheet Metal

V. Fastening

VI. Casting and Molding

VII. Forging

VIII. Bending

IX. The Industrial Arts Student Association

TASK # 1

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Metalworking Occupations

TASK: Demonstrate an Understanding of Metalworking Occupations.

CRITERION REFERENCED MEASURE: Select a number of metalworking occupations and list the following characteristics: probable duration of the occupation, wage or salary to be expected, physical requirements, and the educational level required for job entry.

PERFORMANCE GUIDES:

1. Check with the state employment agency.
2. Read the text assignment on metalworking occupations.
3. Observe the class presentations.
4. Observe possible field trips to industry such as - shipyards, foundries, the local airport, auto body repair shops, jewelry shops, and tool and die works.
5. Discuss job characteristics with persons employed in metalworking jobs.
6. Organize class to simulate roles in metal industries.

TASK # 2

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Metal Characteristics

TASK: Develop an Understanding of Metal Composition.

CRITERION REFERENCED MEASURE: Demonstrate a knowledge of what metal is in terms of elements, compounds, electrical characteristics, and sources.

PERFORMANCE GUIDES:

1. Read the text assignment on metal characteristics.
2. Observe class presentations.
3. Study element charts.
4. Observe movies about metal structure.
5. Identify regions of deposits of metals.
6. Describe metal grain and crystal structure.
7. Construct a map of metallic resource locations.

TASK # 3

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Metal Characteristics

TASK: Demonstrate a Knowledge of Metal Characteristics.

CRITERION REFERENCED MEASURE: Demonstrate a knowledge of metal characteristics in terms of hardness, brittleness, malleability, ductility, elasticity, fusibility, machinability, and resistance to corrosion.

PERFORMANCE GUIDES:

1. Read the text assignment on metal characteristics.
2. Observe class presentations.
3. Check an encyclopedia for metal characteristics.
4. Check a dictionary for metal characteristics.
5. Participate in class discussions.
6. Participate in class experiments.

TASK # 4

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Common Metal Stock

TASK: Demonstrate a Knowledge of Metal Common Stock.

CRITERION REFERENCED MEASURE: Demonstrate a knowledge of common metal stock by describing readily available materials such as bar stock rounds, squares, flats, hexagons, octagons, and galvanized steel sheet, galvanized sheet iron, tin plate, black iron sheets, sheet copper, sheet aluminum, and stainless steel sheet.

PERFORMANCE GUIDES:

1. Read the text assignment of standard/common stock.
2. Observe class presentations.
3. Make lists of common stock.
4. Participate in class discussions.
5. Inspect the stock in the lab stock storage.
6. Collect samples of common metal stock.

TASK # 5

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Safety in Metalworking

TASK: Demonstrate a Knowledge of Metalworking Lab General Safety Rules.

CRITERION REFERENCED MEASURE: Demonstrate a knowledge of metalworking lab safety procedures, devices, rules, and clothing to be worn.

PERFORMANCE GUIDES:

1. Read the text assignment on lab safety.
2. Observe the class presentations on safety.
3. Make safety posters.

TASK # 6

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Planning

TASK: Develop Skill in Planning Project Work.

CRITERION REFERENCED MEASURE: Demonstrate skill in the following planning areas: reading and making working drawings and sketches, blueprints, and bills of materials.

PERFORMANCE GUIDES:

1. Read the text assignment on planning.
2. Observe the class presentations.
3. Employ prepared handouts.
4. Make a bill of materials.
5. Interpret a working drawing.
6. Observe films on planning processes.
7. Make working drawings of planned projects.

TASK # 7

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Measuring

TASK: Develop Skill in the Use of Measuring Devices Including both the Standard International Metric and English Systems.

CRITERION REFERENCED MEASURE: Demonstrate skill in making accurate measurements using squares, rules, calipers, micrometers, levels, and protractors in both the Metric and English systems.

PERFORMANCE GUIDES:

1. Read the text assignment on measuring devices.
2. Observe the class presentations.
3. Participate in class discussion and practice sessions.
4. Practice using measuring instruments.

TASK # 8

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Layout

TASK: Develop Skill in Layout.

CRITERION REFERENCED MEASURE: Demonstrate skill in layout using such tools as rules, squares, scribers, machinists hammer, dividers, calipers, trammel points, bevel protractor, combination square with center head, "V" blocks, layout dye, prick punch, and center punch.

PERFORMANCE GUIDES:

1. Read the text assignment on layout procedures and tools.
2. Observe the class presentations.
3. Participate in the class discussion and practice sessions.
4. Observe films on layout methods.
5. Layout a project.

TASK # 9

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Sheet Metal Hand Tools - Cutting

TASK: Develop Skill in Using Sheet Metal Cutting Hand Tools.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the hack saw, chisel, aviation snips, hawks bill snips, straight snips, curved snips, double-cutting shears, bench shears, punches on sheet metal.

PERFORMANCE GUIDES:

1. Read the text assignment on hand tools.
2. Observe class presentations.
3. Participate in class discussion and practice sessions.

TASK # 10

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Sheet Metal Hand Tools - Shaping

TASK: Develop Skill in Using Sheet Metal Shaping Hand Tools.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the bench plate, stakes, mallet, hand seamer, riveting hammer, setting down hammer, pliers, and hand groover on sheet metal.

PERFORMANCE GUIDES:

1. Read the text assignments on sheet metal shaping hand tools.
2. Observe the class presentations.
3. Participate in the class discussion and practice sessions.

TASK # 11

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Sheet Metal Machines - Forming

TASK: Develop Skill in Using the Forming Machine.

CRITERION REFERENCED MEASURE: Demonstrate skill in forming, burring, wiring, crimping, and beading sheet metal with the turning machine.

PERFORMANCE GUIDES:

1. Read the text assignment on the turning machine.
2. Observe the class presentations.
3. Participate in the class discussion and practice sessions.

TASK # 12

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Sheet Metal Machines - Bending

TASK: Develop Skill in Using Sheet Metal Bending Machines.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the bar folder, grooving machine, cornice brake, box-and-pan brake, and slip roll forming machine.

PERFORMANCE GUIDES:

1. Read the text assignments on sheet metal forming machines.
2. Observe class presentations.
3. Participate in class discussion and project construction.

TASK # 13

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Sheet Metal Machines - Cutting

TASK: Develop Skill in Using Sheet Metal Cutting Machines.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the squaring shears, ring and circle shears, portable electric shears, hand operated punching machine, and band saw.

PERFORMANCE GUIDES:

1. Read the text assignments on sheet metal cutting machines.
2. Observe class presentations.
3. Participate in class discussions and project construction.

TASK # 14

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Drilling

TASK: Develop Skill in Drilling.

CRITERION REFERENCED MEASURE: Demonstrate skill in drilling with a drill press, power hand drill, and hand drill using two fluted twist drills.

PERFORMANCE GUIDES:

1. Read the text assignment on drilling.
2. Observe the class presentations.
3. Participate in the class discussion and project construction.

TASK # 15

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Industrial Sheet Metal Machines

TASK: Gain an Awareness of Industrial Sheet Metal Processing Machines.

CRITERION REFERENCED MEASURE: Demonstrate a knowledge of industrial sheet metal processing machines by discussing the power shears, the press brake, and the multiple drill press, and the jobs performed on these machines.

PERFORMANCE GUIDES:

1. Read the text assignment on industrial machines.
2. Observe the class presentations.
3. Participate in possible field trips.
4. Observe movie and slide presentations.
5. Discuss industrial employment related to the above machines.

TASK # 16

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Fastening

TASK: Demonstrate a Knowledge of Solders and Fluxes.

CRITERION REFERENCED MEASURE: Describe the variations in solder types, flux types, and standard stock types including lead to tin ratios, kind of material to be soldered, hard soldering, soft soldering, flux core wire, solid wire, ribbon, bar, slab, acid flux, rosin flux, liquid paste flux and powder flux.

PERFORMANCE GUIDES:

1. Read the text assignment on soldering.
2. Observe the class presentations.
3. Participate in the class discussions and practices.

TASK # 17

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Fastening

TASK: Develop Skill in Soldering.

CRITERION REFERENCED MEASURE: Demonstrate skill in soldering using a pre-tinned iron /coppers and an electric iron and using the correct flux and solder for the job.

PERFORMANCE GUIDES:

1. Read the text assignment on soldering.
2. Observe the class presentations.
3. Participate in class discussions and practice sessions.

TASK # 18

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Fastening

TASK: Develop Skill in Using the Spot Welder.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the spot welder by welding different gauges and types of sheet metals.

PERFORMANCE GUIDES:

1. Read the text assignment on spot welding.
2. Observe the class presentations.
3. Participate in class discussions and practice sessions.

TASK # 19

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Fastening

TASK: Demonstrate a Knowledge of Threaded Fasteners.

CRITERION REFERENCED MEASURE: Demonstrate a knowledge of threaded fasteners by suggesting uses for the following screws and bolts: stove bolts, carrage bolts, cap screws, round head screws, flat head screws, fillister head screws, oval head screws, and studs.

PERFORMANCE GUIDES:

1. Read the text assignment for threaded fasteners.
2. Observe the class demonstrations.
3. Participate in class discussions and practice sessions.

TASK # 20

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Fastening

TASK: Develop Skill in Riveting.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the following riveting tools : pop-rivet gun, riveting block, rivet set, ball peen hammer, and in selecting the right size rivets for the job.

PERFORMANCE GUIDES:

1. Read the text assignment on riveting.
2. Observe the class presentations.
3. Participate in class discussions and practices.

TASK # 21

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Fastening

TASK: Develop Skill in Oxyacetylene Welding.

CRITERION REFERENCED MEASURE: Demonstrate skill in using oxyacetylene welding equipment.

PERFORMANCE GUIDES:

1. Read the text assignment on welding.
2. Observe the class presentations.
3. Take part in class discussions.
4. Practice welding.

TASK # 22

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Fastening

TASK: Develop Skill in Electric Arc Welding.

CRITERION REFERENCED MEASURE: Demonstrate skill in electric arc welding.

PERFORMANCE GUIDES:

1. Read the text assignment on welding.
2. Observe the class presentations.
3. Take part in class discussions.
4. Practice welding.

TASK # 23

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Casting

TASK: Acquire a Knowledge of Casting Techniques.

CRITERION REFERENCED MEASURE: Demonstrate a knowledge of sand casting, die casting, and investment casting.

PERFORMANCE GUIDES:

1. Read the text assignment on casting.
2. Observe the class presentations.
3. Participate in class discussions.
4. Cast project using laboratory equipment available.

TASK # 24

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Molding

TASK: Acquire a Knowledge of Molding Techniques.

CRITERION REFERENCED MEASURE: Demonstrate a knowledge of the plaster molding, permanent molding, and shell molding processes.

PERFORMANCE GUIDES:

1. Read the text assignment on molding.
2. Observe the class presentations.
3. Participate in class discussions.

TASK # 25

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Heat Treating

TASK: Acquire a Knowledge of Heat Treating Metals.

CRITERION REFERENCED MEASURE: Demonstrate a knowledge of annealing, normalizing, relieving, case hardening, surface hardening, and tempering.

PERFORMANCE GUIDES:

1. Read the text assignment on heat treating metals.
2. Observe the class presentations.
3. Participate in class discussions and practices.
4. Study the temperature charts.

TASK # 26

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Forging

TASK: Develop Skill in Forging.

CRITERION REFERENCED MEASURE: Demonstrate skill in the hand forging process by selecting and using the correct forge temperature, tongs, hammers, and anvil to forge a project.

PERFORMANCE GUIDES:

1. Read the text assignment on forging.
2. Observe the class presentations.
3. Take part in class discussions.
4. Practice forging.

TASK # 27

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: Bending Rod and Bar Stock

TASK: Develop Skill in Bending Rod and Bar Stock.

CRITERION REFERENCED MEASURE: Demonstrate skill in bending rod and bar stock using the vice, hammers, bending fork, former, conventional bender, and the universal bender.

PERFORMANCE GUIDES:

1. Read the text on bending and twisting.
2. Observe the class presentations.
3. Take part in class discussions.
4. Use forming equipment for project construction.

TASK # A.I.A.S.A.

AREA OF COMPETENCE: Metals Technology I

CONTENT/CONCEPT: In Class Industrial Arts Student Association

TASK: Participation (involvement) in a democratic organization with activities using course content.

CRITERION REFERENCED MEASURE: Participate with other students in organized activities using industrial resources, leadership or followership, service or enterprise projects and recognition for workmanship.

PERFORMANCE GUIDES:

1. Organize class into personnel system for democratic decision making and leader/follower development.
2. Invite speakers to class and use resources of industry and technology from the community.
3. Carry out worthy group activities and projects to improve or serve school or community.
4. Operate an enterprise system to produce item of economic value.
5. Encourage competition in areas of course to motivate and recognize achievement.

NOTE: These performance guides are expanded in the publication titled Student Association Activities in Industrial Arts Instruction available from the Industrial Arts Service, Virginia Department of Education, Richmond, Virginia 23216.

METALS TECHNOLOGY II

COURSE DESCRIPTION:

Students apply advanced processes and machine tools to make products representing metal industries. The technologies used in the production, processing and use of metals along with the related factors such as occupations, economics and consumer information are emphasized.

COURSE GOALS:

Experiences and activities of this INDUSTRIAL ARTS course will enable the student to:

1.1 compare and contrast the kinds, composition and characteristics of various metals.

1.2 describe the relationship between speed and feed and apply this to safe and correct operation of metal processing machines.

1.3 recognize the possible employment opportunities in the metals industry.

2.1 construct strength and elasticity tests to distinguish limitations between two steels.

2.2 properly select and use metal processing tools and equipment for a given project or metal product

2.3 perform in a safe manner the operations with machine tools, equipment and materials which are needed to produce a metal product.

2.4 demonstrate problem-solving techniques in the selection of suitable materials for given uses.

3.1 exhibit good work habits, respect for and cooperation with associates.

3.2 evaluate the application of technological processes in the production of metal products.

SUGGESTED TOPICAL OUTLINE:

I. Introduction to Metalworking

II. Planning and Design

III. Screw Threads

IV. Machine Tools
- A. Grinder
- B. Lathe
- C. Shaper
- D. Milling Machine

V. Welding

VI. Finishing

VII. The Industrial Arts Student Association

TASK # 28

AREA OF COMPETENCE: Metals Technology II

CONTENT/CONCEPT: Metalworking Occupations

TASK: Acquire an Understanding of Metalworking Occupations.

CRITERION REFERENCED MEASURE: Select a number of metalworking occupations and list the following characteristics: probable duration of the occupation, wage or salary to be expected, physical requirements, and the skill and educational level required for job entry.

PERFORMANCE GUIDES:

1. Check with the state employment agency.
2. Read the text assignment on metalworking occupations.
3. Observe the class presentations.
4. Observe possible field trips to industry such as - shipyards, foundries, the local airport, auto body repair shops, jewelry repair shops, and tool and die works,....
5. Interview persons employed in metalworking occupations.
6. Organize class to simulate roles in metal industries.

TASK # 29

AREA OF COMPETENCE: Metals Technology II

CONTENT/CONCEPT: Planning

TASK: Develop Skill in Making and Reading Sketches, Drawings, and Bills of Materials.

CRITERION REFERENCED MEASURE: Develop skill in making and using drawings, sketches, and bills of materials.

PERFORMANCE GUIDES:

1. Read the text assignment on planning.
2. Observe the class presentation.
3. Take part in class discussions.
4. Make drawings, sketches, and bills of materials in planning a project.

TASK # 30

AREA OF COMPETENCE: Metals Technology II

CONTENT/CONCEPT: Metal Characteristics

TASK: Demonstrate a Knowledge of the Characteristics of Metals.

CRITERION REFERENCED MEASURE: Describe the characteristics of iron, steel, aluminum, copper, chromium, tin, zinc, nickel, and lead.

PERFORMANCE GUIDES:

1. Read the text assignment on metal characteristics and properties.
2. Observe the class presentations.
3. Participate in class discussions and practice sessions.
4. Conduct experiments on metal characteristics.
5. Discuss types of metals to use on specific jobs.
6. Locate local sources of the above metals.
7. Discuss the life expectancies of the above metals.
8. Identify resource deposits of the above metals.

TASK # 31

AREA OF COMPETENCE: Metals Technology II

CONTENT/CONCEPT: Design

TASK: Develop Skill in Design.

CRITERION REFERENCED MEASURE: Demonstrate skill in design including the following characteristics: form, shape, unity, variety, balance, symmetry, proportion, line and rhythm.

PERFORMANCE GUIDES:

1. Read the text assignment on design.
2. Observe class demonstrations.
3. Participate in class discussions.
4. Design projects incorporating the above design principles.

TASK # 32

AREA OF COMPETENCE: Metals Technology II

CONTENT/CONCEPT: Screw Threads

TASK: Acquire a Knowledge of Screw Threads.

CRITERION REFERENCED MEASURE: Demonstrate a knowledge of screw threads including single thread, double thread, triple thread, quadruple thread, left hand thread, right hand thread, pitch, root, clearance, depth, lead, angle, thread type, and major and minor diameters.

PERFORMANCE GUIDES:

1. Read the text assignment on screw threads.
2. Observe the class presentations.
3. Observe movie or slide presentations.
4. Collect and label threaded screw fasteners.
5. Read screw thread and tap drill charts.

TASK # 33

AREA OF COMPETENCE: Metals Technology II

CONTENT/CONCEPT: Screw Threads

TASK: Develop Skill in Using a Tap and Die Set.

CRITERION REFERENCED MEASURE: Demonstrate skill in using a tap and die set by drilling and threading a hole and threading round stock.

PERFORMANCE GUIDES:

1. Read the text assignment on screw threads.
2. Observe the class presentations.
3. Participate in class discussions.
4. Practice thread cutting.

TASK # 34

AREA OF COMPETENCE: Metals Technology II

CONTENT/CONCEPT: Machine Tools

TASK: Develop Skill in Using the Grinder.

CRITERION REFERENCED MEASURE: Demonstrate skill in selecting and maintaining grinder wheels and in using the grinder.

PERFORMANCE GUIDES:

1. Read the text assignment.
2. Observe the class presentations.
3. Practice using the grinder.
4. Practice dressing the wheels.
5. Practice sharpening tools.

TASK # 35

AREA OF COMPETENCE: Metals Technology II

CONTENT/CONCEPT: Machine Tools

TASK: Develop Skill in Using the Metal Lathe.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the metal lathe including turning, between centers and face plate, tapering, threading and feeding, changing speeds and using accessories.

PERFORMANCE GUIDES:

1. Read the text assignment on the metal lathe.
2. Observe the class presentations.
3. Take part in class discussions.
4. Practice on the lathe.
5. Make a project on the metal lathe.

TASK # 36

AREA OF COMPETENCE: Metals Technology II

CONTENT/CONCEPT: Machine Tools

TASK: Develop Skill in Using the Shaper.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the shaper including speed change mechanisms, tool holders, angle, horizontal and vertical cutting, plane and irregular cutting..

PERFORMANCE GUIDES:

1. Read the text assignment on the shaper.
2. Observe the class presentations.
3. Take part in class discussions.
4. Practice using the shaper.

TASK # 37

AREA OF COMPETENCE: Metals Technology II

CONTENT/CONCEPT: Machine Tools

TASK: Develop Skill in Using the Milling Machine.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the milling machine including the following: workpiece holding devices, cutting speeds, feeds, plain milling, and slab milling.

PERFORMANCE GUIDES:

1. Read the text assignment on milling machines.
2. Observe the class presentations.
3. Take part in class discussions.
4. Practice using the milling machine.

TASK # 38

AREA OF COMPETENCE: Metals Technology II

CONTENT/CONCEPT: Gas Welding

TASK: Develop Skill in Using the Oxyacetylene Welding Process.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the oxyacetylene welding process for brazing, welding, and cutting various sizes and types of metals.

PERFORMANCE GUIDES:

1. Read the text assignments on gas welding.
2. Observe the class presentations.
3. Practice welding, brazing, and cutting with the oxyacetylene torch.

TASK # 39

AREA OF COMPETENCE: Metals Technology II

CONTENT/CONCEPT: Electric Arc Welding

TASK: Develop Skill in Electric Arc Welding.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the electric arc welding equipment by selecting correct rods, current settings, and welding in horizontal, vertical, and overhead positions on various types and sizes of metal.

PERFORMANCE GUIDES:

1. Read the text assignments.
2. Observe the class presentations.
3. Practice welding.
4. Use the welding guide charts.

TASK # 40

AREA OF COMPETENCE: Metals Technology II

CONTENT/CONCEPT: Metal Finishing

TASK: Develop Skill in Preparing Metals for Finishing.

CRITERION REFERENCED MEASURE: Demonstrate skill in cleaning, buffing, and polishing metals.

PERFORMANCE GUIDES:

1. Read the text assignment on metal finishing.
2. Observe the class presentations.
3. Take part in class discussions.
4. Practice cleaning, buffing, and polishing.

TASK # A.I.A.S.A.

AREA OF COMPETENCE: Metals Technology II

CONTENT/CONCEPT: In Class Industrial Arts Student Association

TASK: Participation (involvement) in a democratic organization with activities using course content.

CRITERION REFERENCED MEASURE: Participate with other students in organized activities using industrial resources, leadership or followership, service or enterprise projects and recognition for workmanship.

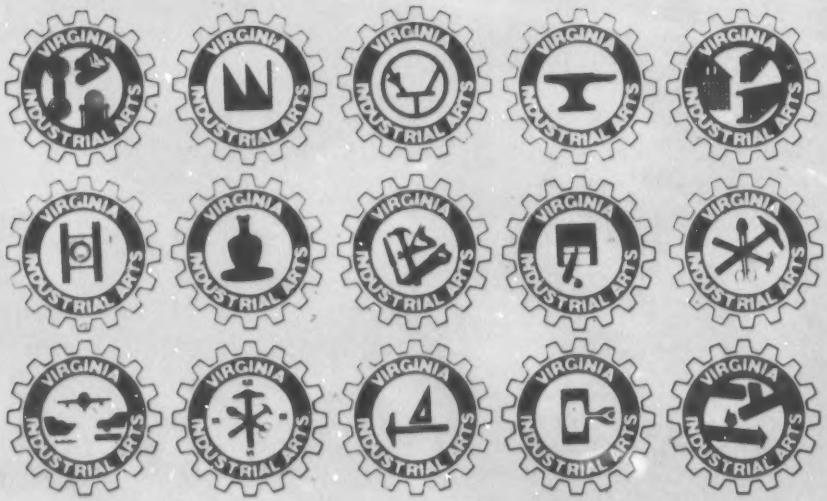
PERFORMANCE GUIDES:

1. Organize class into personnel system for democratic decision making and leader/follower development.
2. Invite speakers to class and use resources of industry and technology from the community.
3. Carry out worthy group activities and projects to improve or serve school or community.
4. Operate an enterprise system to produce item of economic value.
5. Encourage competition in areas of course to motivate and recognize achievement.

NOTE: These performance guides are expanded in the publication titled Student Association Activities in Industrial Arts Instruction available from the Industrial Arts Service, Virginia Department of Education, Richmond, Virginia 23216.

A CATALOG OF TASKS
FOR
COMPETENCY-BASED INSTRUCTION
IN

Woods Technology
I & II



Industrial Arts Education Service
Department of Education
Commonwealth of Virginia
Richmond, Virginia 23216
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This Catalog of Tasks
Was Prepared At
Old Dominion University
Department of Vocational and Industrial Arts Education
By

John M. Ritz, Project Co-Director
David I. Joyner, Project Co-Director
Lawrence W. Thrasher, Research Assistant

Members of the Advisory Committee
Who Supervised This Curriculum Development
Project Included

David I. Joyner, Co-Chairman, Old Dominion University
John M. Ritz, Co-Chairman, Old Dominion University
Arvid Van Dyke, Virginia State College
Russell G. Louis, Virginia Polytechnic Institute and State University
Charles A. Pinder, Virginia Polytechnic Institute and State University
James A. Jacobs, Norfolk State University
Paul Cummings, Newport News
Peter Fulcer, Loudoun County
Leo Gibbs, Portsmouth

For further information concerning this
competency catalog write to
Industrial Arts Education Service
Division of Vocational Education, Department of Education
P.O. Box 6Q, Richmond, Virginia 23216

INTRODUCTION

In the summer of 1977, The Industrial Arts Curriculum K-12 was introduced. This plan outlined the preferred courses, course sequences, and purposes which should be addressed in Virginia industrial arts programs. However, the model curriculum plan did not establish exact knowledge, skills, and attitudes which all learners should possess as they exit particular programs.

The purpose of the following competency catalog of tasks is to establish a basis for program content selection and criterion levels from which one may measure to see if individual learners have achieved a minimal level of competence through study in a particular course. In this manner a means to improve education and its accountability to citizenry can be designed based upon the identification and attainment of prespecified outcomes for the industrial arts content area. Although this catalog is designed and presented in a sequencial order of task statements, it does not mean that it must be structured into local programs in this order. Individual instructors may choose to restructure the sequence of competency tasks to meet local needs.

In preparing this catalog considerable research and validation was undertaken to specify those minimal tasks which every learner enrolling in the course should be able to perform. The format of this and other catalogs includes the following areas: area of competence, content/concept, task, criterion referenced measure, and performance guides. The area of competence identifies the industrial arts course for which the particular task was prepared. Content/concept identifies the sub-area with which the particular task is associated. The task is the knowledge, skills or attitudes which the learner should possess after instruction in the industrial arts class. Criterion references measures are means to identify if the learner can successfully perform the stated task and finally, performance guides are sub-tasks which lead to the development of the knowledge, skills and attitudes

identified in the tasks. These areas are illustrated in Table 1. It should be noted that performance objectives have been omitted from the catalogs of tasks. This was done to allow individual instructors to develop objectives they see necessary to meet the local learning environment.

In Table 2 is identified the location of this course in the total program of industrial arts for Virginia. Other competency catalogs are contained in this publication and the remaining catalogs may be obtained from the Industrial Arts Education Service, Division of Vocational Education, Department of Education, P.O. Box 6Q, Richmond, Virginia 23216.

FORMAT DESCRIPTION

AREA OF COMPETENCE: Identifies the industrial arts course for which the particular task was prepared.

CONTENT/CONCEPT: Identifies the sub-area which the particular task is associated.

TASK: Identifies the knowledge, skills, or attitudes which the learner should possess after completing instruction in the industrial arts class.

CRITERION REFERENCED MEASURE: The means to identify if the learner can successfully perform the stated task.

PERFORMANCE GUIDES: Identifies sub-tasks which lead to the development of the knowledge, skills, and attitudes identified in the tasks.

TABLE 1

The Industrial Arts Curriculum

Level	Goal	Program
Elementary School	Learning Reinforcement	Industrial Arts activities integrated within the elementary curriculum
Middle or Junior High School	Orientation and Exploration	Exploring Technology Modern Industry Construction Manufacturing
High School	Technical	Communication Technology Materials and Processes Technology Power and Transportation Technology Architectural Drawing Basic Technical Drawing Electricity and Electronics Energy and Power Engineering Drawing Graphic Communications Metals Technology Woods Technology
	Personal Enrichment	General Industrial Arts Industrial Crafts

TABLE 2

WOODS TECHNOLOGY I

COURSE DESCRIPTIONS:

Students design, plan and build wood products as they study the woodworking industry. Students use both hand tools and power equipment to develop avocational skills, an understanding of manufactured products and the fundamentals of woodworking.

COURSE GOALS:

Experiences and activities of this INDUSTRIAL ARTS course will enable the student to:

1.1 evaluate methods and processes employed by industry to produce wood products and conserve timber resources.

1.2 describe the apprentice and skill levels for major occupational areas in wood products processing and fabrication.

1.3 describe the activities of a design department in industries applying wood technology.

1.4 develop a plan of procedure and operation for machining and fabricating a wood product.

2.1 exhibit proficiency in safely performing a variety of machine and tool operations for processing and shaping wood.

2.2 investigate and experiment with basic wood machining processes for mass production of a wood product.

2.3 investigate and explore the materials, processes and products of the wood industry, and its impact on society.

3.1 display orderly work habits and show consideration for fellow workers.

3.2 Practice or demonstrate the safety measures necessary in a wood manufacturing plant.

SUGGESTED TOPICAL OUTLINE:

I. Introduction to Woodworking
   A. Occupations
   B. Safety

II. Wood Science

III. Lumber and Processed Woods

IV. Design Principles, Reading Drawings and Planning

V. Basic Hand Tool Processes
   A. Saws
   B. Planes and Files
   C. Boring Tools

VI. Wood Product Construction
   A. Fasteners
   B. Surface Preparation
   C. Finishing

VII. Powered Tools
   A. Table Saw
   B. Band Saw
   C. Scroll Saw
   D. Drill Press
   E. Powered Hand Tools

VIII. The Industrial Arts Student Association: Wood Product Industries

TASK # 1

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Woodworking Occupations

TASK: Acquire an Awareness of Woodworking Occupations.

CRITERION REFERENCED MEASURE: Select a number of woodworking occupations and list the following characteristics - probable duration of the occupation, wage or salary to be expected, physical requirements, and the educational level required for job entry.

PERFORMANCE GUIDES:

1. Check with the state employment agency.
2. Read the text assignment on woodworking.
3. Observe the class presentations.
4. Observe and participate in any possible field trips, such as - construction sites, furniture factories, cabinetmakers, tool and die makers, boat builders, etc....

TASK # 2

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Safety

TASK: Acquire an Awareness of General Lab Safety.

CRITERION REFERENCED MEASURE: List and explain the general lab safety rules.

PERFORMANCE GUIDES:

1. Read the text assignment on safety.
2. Observe class presentations.
3. Participate in class discussions.
4. Make a list of the safety rules.
5. Practice safety rules every time you are in the lab.

TASK # 3

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Wood Science

TASK: Acquire an Awareness of the Nature of Wood.

CRITERION REFERENCED MEASURE: Describe the nature of wood in terms of springwood, summerwood, cells, and fibers.

PERFORMANCE GUIDES:

1. Read the text assignment on the nature of wood.
2. Observe class presentations.
3. Participate in class discussions.
4. Select a piece of wood for demonstrating springwood and summerwood.
5. Make a sketch of cells and fibers.
6. Observe wood samples and describe characteristics.

TASK # 4

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Wood Science

TASK: Differentiate Between Hardwoods and Softwoods.

CRITERION REFERENCED MEASURE: Demonstrate a knowledge of hardwoods and softwoods including listing hardwoods and softwoods, identifying applications, and discussing wood classification processes.

PERFORMANCE GUIDES:

1. Read the text assignment on wood types and identification.
2. Observe class presentations.
3. Participate in class discussions.
4. Make lists of hardwoods and softwoods.
5. Participate in possible field trips to lumber mills and lumber yards.
6. Experiment with samples of hardwoods and softwoods.

TASK # 5

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Wood Science

TASK: Describe Tree Structure.

CRITERION REFERENCED MEASURE: Illustrate and label a tree structure including - heartwood, sapwood, cambium, phloem, and outer bark.

PERFORMANCE GUIDES:

1. Read the text assignment on tree structure.
2. Observe class presentations.
3. Participate in class discussions.
4. Using a sample tree trunk, identify the components of the tree structure.
5. Observe a lecture by forestry service representative.

TASK # 6

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Wood Science

TASK: Acquire a Knowledge of Wood Grain.

CRITERION REFERENCED MEASURE: Describe wood grain including quarter cut lumber, plain cut lumber, open grain, semi-open grain, and closed grain.

PERFORMANCE GUIDES:

1. Read the text assignment on wood grain and types of cuts.
2. Observe class presentations.
3. Participate in class discussions.
4. Participate in possible field trips to a lumber mill.
5. Select wood samples and identify the types of mill cuts and types of grain.
6. Observe a film about wood grain.

TASK # 7

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Lumber

TASK: Describe Lumber Seasoning.

CRITERION REFERENCED MEASURE: Characterize the seasoning of lumber including drying times, drying methods, moisture content, use of steam, air drying, kiln drying, and radio frequency drying.

PERFORMANCE GUIDES:

1. Read the text assignment on seasoning.
2. Observe class presentations.
3. Participate in class discussions.
4. Participate in possible field trips to lumber yards or lumber mills.
5. List seasoning methods.

TASK # 8

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Lumber

TASK: Acquire a Knowledge of Lumber Defects.

CRITERION REFERENCED MEASURE: List and describe lumber defects including checks, pecks, shakes, heart pith, knot decay, stain, pitch pockets, warp, bow, and crook.

PERFORMANCE GUIDES:

1. Read the text assignment on lumber defects.
2. Observe class presentations.
3. Participate in class discussions.
4. List the defects of lumber.
5. Collect samples of lumber defects.
6. Participate in possible field trips to lumber yards.

TASK # 9

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Lumber

TASK: Develop Skill in Computing Board Feet.

CRITERION REFERENCED MEASURE: Describe board foot measure including purpose and computation.

PERFORMANCE GUIDES:

1. Read the text assignment on board foot measure.
2. Observe class presentations.
3. Participate in class discussions.
4. Practice measurement exercises.
5. Participate in possible field trips to lumber yards.
6. Calculate the board feet of lumber needed for projects.

TASK # 10

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Processed Woods

TASK: Describe the Characteristics of Plywood.

CRITERION REFERENCED MEASURE: Characterize plywood including source, structure, and function.

PERFORMANCE GUIDES:

1. Read the text assignment on plywood.
2. Observe class presentations.
3. Participate in class discussions.
4. List advantages and disadvantages of plywood.
5. List types and grades of plywoods.
6. List uses for plywood.
7. Collect samples of plywoods.

TASK # 11

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Processed Woods

TASK: Describe the Characteristics of Veneers.

CRITERION REFERENCED MEASURE: Characterize wood veneer including source, structure, and function.

PERFORMANCE GUIDES:

1. Read the text assignment on veneering.
2. Observe class presentations.
3. Participate in class discussions.
4. Participate in field trip to a veneer mill.
5. List uses for veneers.
6. Collect samples of veneers.

TASK # 12

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Processed Woods

TASK: Describe the Characteristics of Hardboard and Fiberboard.

CRITERION REFERENCED MEASURE: Characterize hardboard and fiberboard in terms of construction, size availability, and uses.

PERFORMANCE GUIDES:

1. Read the text assignment on processed wood.
2. Observe class presentations.
3. Participate in class discussions.
4. Participate in field trip to wood processing plant.
5. List characteristics and some uses of hardboard and fiberboard.

TASK # 13

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Planning

TASK: Develop Skill in Planning.

CRITERION REFERENCED MEASURE: Demonstrate the ability to properly plan a project including sketches, drawings, bills of materials, and lists of needed tools.

PERFORMANCE GUIDES:

1. Read the text assignment on planning.
2. Observe the class presentations.
3. Participate in class discussions.
4. Practice sketches, drawings, material bills, and tool lists for a project (s) you would like to make.

TASK # 14

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Layout Tools

TASK: Develop Skill in Using Layout Tools, Both English and S.I. Metric.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the following layout tools - bench rule, zig zag rule, flexible tape rules, marking gauge, squares, sliding T bevel, dividers or trammel points, level, and plumb bob and line.

PERFORMANCE GUIDES:

1. Read the text assignment on layout.
2. Observe the class presentations.
3. Participate in class discussions.
4. Select a project(s) and lay it out.
5. Select various appropriate articles and demonstrate measuring with different kinds of rules including metric measurements.

TASK # 15

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Hand Tools

TASK: Develop Skill in the Use of Hand Saws.

CRITERION REFERENCED MEASURE: Demonstrate the correct and safe use of the following hand saws - back saw, cross cut, rip, compass, keyhole, coping, miter box, and dovetail saw.

PERFORMANCE GUIDES:

1. Read the text assignment on hand saws.
2. Observe the class presentations.
3. Participate in class exercises in sawing.
4. Demonstrate good sawing practices.
5. Observe a training film on hand saw usage.

TASK # 16

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Hand Tools

TASK: Develop Skill in the Use of Hand Planes.

CRITERION REFERENCED MEASURE: Demonstrate the correct and safe use of the following planes - block plane, jack plane, fore plane, and spoke shave.

PERFORMANCE GUIDES:

1. Read the text assignment on planes.
2. Observe class presentations.
3. Participate in class discussions.
4. Take apart and assemble the jack plane.
5. Practice using planes.
6. Observe a training film on hand plane.

TASK # 17

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Hand Tools

TASK: Develop Skill in the Use of the Chisel, Gouge, and Carving Tools.

CRITERION REFERENCED MEASURE: Demonstrate the correct and safe method to use the chisel, gouge, and carving tools.

PERFORMANCE GUIDES:

1. Read the text assignment on carving tools.
2. Observe class presentations.
3. Participate in class discussions.
4. Practice using the chisel, gouge, and carving tools.

TASK # 18

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Hand Tools

TASK: Develop Skill in the Use of the Miter Box.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the miter box including making square and angled cuts.

PERFORMANCE GUIDES:

1. Read text assignment on miter box.
2. Observe class presentations.
3. Participate in class discussions.
4. Practice using the miter box.

TASK # 19

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Hand Tools

TASK: Develop Skill in Using Surform Tools and Wood Files.

CRITERION REFERENCED MEASURE: Demonstrate skill in using surform tools and wood files.

PERFORMANCE GUIDES:

1. Read the text assignment concerning surform tools and files.
2. Observe the class presentations.
3. Practice using surform tools and wood files.
4. Take part in class discussions.

TASK # 20

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Hand Tools

TASK: Develop Skill in the Use of the Hand Scraper and Cabinet Scraper.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the hand scraper and cabinet scraper.

PERFORMANCE GUIDES:

1. Read the text assignment on the hand scraper and the cabinet scraper.
2. Observe the class presentations.
3. Participate in the class discussions.
4. Practice using the hand scraper and cabinet scraper.

TASK # 21

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Hand Tools

TASK: Develop Skill in the Use of Hand Boring Tools.

CRITERION REFERENCED MEASURE: Demonstrate skill in using hand boring tools including the automatic drill, hand drill, brace, expansive bit, auger bit, dowel bit, forstner bit, and twist drill.

PERFORMANCE GUIDES:

1. Read the text assignment on hand boring tools.
2. Observe the class presentations.
3. Practice using the hand boring tools.
4. Participate in class discussions.
5. Observe a film strip on hand boring.

TASK # 22

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Fasteners

TASK: Develop Skill in Selecting and Using Nails and Screws.

CRITERION REFERENCED MEASURE: Demonstrate skill in selecting and using the correct nails and screws for different jobs.

PERFORMANCE GUIDES:

1. Read the text assignment on nails and screws.
2. Participate in class discussions.
3. Observe class presentations.
4. Practice using screws and nails.
5. Discuss the practice of pre-drilling and countersinking.
6. Observe films on fastening.

TASK # 23

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Fasteners

TASK: Develop Skill in Selecting and Using Fasteners.

CRITERION REFERENCED MEASURE: Demonstrate skill in selecting and using fasteners including molly bolts, miter joint fasteners, toggle bolts, repair plates, T plates, bent corner plates, clat corner plates, and chevrons.

PERFORMANCE GUIDES:

1. Read the text assignment concerning fasteners.
2. Observe class presentations.
3. Participate in class discussions.
4. Practice using fasteners.

TASK # 24

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Fasteners

TASK: Acquire a Knowledge of Adhesives.

CRITERION REFERENCED MEASURE: Demonstrate a knowledge of adhesives including - liquid hide glue, white liquid resin, resorcinol, powdered resin glue, casein, contact cement, and epoxy resins.

PERFORMANCE GUIDES:

1. Read the text assignment on adhesives.
2. Observe class presentations.
3. Practice using some glues to test their characteristics.
4. List the adhesives under titles of water-proof, water-resistant, and low water resistant.

TASK # 25

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Surface Preparation

TASK: Develop Skill in Raising Dents in Wood and Selecting and Using Fillers, Plastic Wood, and Putty.

CRITERION REFERENCED MEASURE: Demonstrate skill in surface preparation including wood fillers, plastic wood putty, wet cloth and hot iron.

PERFORMANCE GUIDES:

1. Read the text assignments concerning surface preparation.
2. Observe class presentations.
3. Participate in class discussions.
4. Practice preparing wood surfaces.

TASK # 26

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Surface Preparation

TASK: Develop Skill in the Selection and Use of Abrasives.

CRITERION REFERENCED MEASURE: Demonstrate skill in the use of abrasives including materials, backing, bond, grit types, and methods of use.

PERFORMANCE GUIDES:

1. Read the text assignment on abrasives.
2. Observe class presentations.
3. Participate in class discussions.
4. List abrasive materials and discuss their characteristics.
5. List backing materials and discuss their characteristics.
6. List bonding materials and discuss their characteristics.
7. Discuss correct sanding procedures including sealing.

TASK # 27

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Finishing

TASK: Develop Skill in Staining Wood.

CRITERION REFERENCED MEASURE: Demonstrate skill in selecting and using stains including oil stain, spirit stain, water stain, and soluble and insoluble pigment.

PERFORMANCE GUIDES:

1. Read the text assignment on staining.
2. Observe class presentations.
3. Participate in class discussions.
4. List types of stains.
5. Describe soluble and insoluble pigment.
6. Practice staining.
7. Collect and label samples of stained wood for reference use.

TASK # 28

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Finishing

TASK: Develop Painting Skills.

CRITERION REFERENCED MEASURE: Demonstrate the use of paint finishes including oil paint, enamels, latex, and acrylic paints.

PERFORMANCE GUIDES:

1. Read the text assignment on finishing.
2. Observe the class demonstrations.
3. Participate in class discussions.
4. Discuss the properties of oil paints, enamels, latex, and acrylic paints.
5. Practice using paints.

TASK # 29

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Finishing

TASK: Develop Skill in Using Transparent Finishes.

CRITERION REFERENCED MEASURE: Demonstrate skill in using transparent finishes including wax, shellac, varnish, lacquer, oils, and polyurethane.

PERFORMANCE GUIDES:

1. Read the text assignment on finishing.
2. Observe class presentations.
3. Participate in class discussions.
4. List the characteristics of the transparent finishes.
5. Practice using transparent finishes.

TASK # 30

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Powered Tools

TASK: Develop Skill in Using the Table (Circular) Saw.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the table (circular) saw including adjustment of the following parts: table, guard, splitter, fence, miter gauge, raising handle, and tilt handle.

PERFORMANCE GUIDES:

1. Read the text assignment on the table saw.
2. Observe class presentations.
3. Study the table saw operating instructions and safety precautions.
4. Practice using the table saw for ripping and cross cutting.
5. Observe a training film on table saw operation.

TASK # 31

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Powered Tools

TASK: Develop Skill in Using the Band Saw.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the band saw for miter, curve, and freehand cuts and include discussions on the following parts - guide wheels, blade guard, blade support wheel bar or post, lower wheel guard, table tilt handle, upper wheel guard, tension control, and table.

PERFORMANCE GUIDES:

1. Read the text assignment on the band saw.
2. Observe class presentations.
3. Study the band saw operating instructions and safety rules.
4. Practice using the band saw.
5. Observe a training film on band saw operations.

TASK # 32

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Powered Tools

TASK: Develop Skill in Using the Scroll/Jig Saw.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the scroll saw including discussing the selection of the correct blade and blade changing.

PERFORMANCE GUIDES:

1. Read the text assignment on the scroll/jig saw.
2. Observe the class presentations.
3. Practice using the saws.
4. List the safety rules for using the saw.
5. Disucss the blades and blade changing.
6. Observe a training film on the scroll/jig saw.

TASK # 33

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Powered Tools

TASK: Develop Skill in Using the Drill Press.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the drill press including discussing the depth stop, quill lock, quill, chuck, feed handle, column table, table locking clamp, and base.

PERFORMANCE GUIDES:

1. Read the text assignment on the drill press.
2. Read the operating instructions on the drill press.
3. Study the safety rules on using the drill press.
4. Observe the class presentations.
5. Practice using the drill press.
6. Observe a training film on drill press usage.

TASK # 34

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Powered Tools

TASK: Develop Skill in Using the Portable Electric Drill.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the portable electric drill including proper handling, chuck and drill mounting.

PERFORMANCE GUIDES:

1. Read the text assignment on the portable drill.
2. Observe the class presentations.
3. List safety rules of the electric drill.
4. Practice using the portable drill.

TASK # 35

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Powered Tools

TASK: Develop Skill in Using the Electric Hand Sanders.

CRITERION REFERENCED MEASURE: Demonstrate skill in using electric hand belt sanders and electric orbital sanders.

PERFORMANCE GUIDES:

1. Read the text assignments on the electric hand sanders.
2. Observe class presentations.
3. List safety rules.
4. Practice using the sanders.

TASK # 36

AREA OF COMPETENCE: Woods Technology I

CONTENT/CONCEPT: Power Tools

TASK: Develop Skill in Using the Sabre Saw.

CRITERION REFERENCED MEASURE: Cut a beveled, straight, and curved line using the sabre saw.

PERFORMANCE GUIDES:

1. Read the text assignment on the sabre saw.
2. Observe the class presentations.
3. Take part in class discussions.
4. Practice using the sabre saw.
5. Observe a training film on sabre saw useage.

TASK # A.I.A.S.A.

AREA OF COMPETENCE: Wood Technology I

CONTENT/CONCEPT: In Class Industrial Arts Student Association

TASK: Participation (involvement) in a democratic organization with activities using course content.

CRITERION REFERENCED MEASURE: Participate with other students in organized activities using industrial resources, leadership or followership, service or enterprise projects and recognition for workmanship.

PERFORMANCE GUIDES:

1. Organize class into personnel system for democratic decision making and leader/follower development.
2. Invite speakers to class and use resources of industry and technology from the community.
3. Carry out worthy group activities and projects to improve or serve school or community.
4. Operate an enterprise system to produce item of economic value.
5. Encourage competition in areas of course to motivate and recognize achievement.

NOTE: These performance guides are expanded in the publication titled Student Association Activities in Industrial Arts Instruction available from the Industrial Arts Service, Virginia Department of Education, Richmond, Virginia 23216.

WOODS TECHNOLOGY II

COURSE DESCRIPTION:

Students design, plan and build furniture or recreational products using machine tools, processes and wood technology. Creativity is emphasized as students further develop their interests, talents, and abilities in woodworking.

COURSE GOALS:

Experiences and activities of this INDUSTRIAL ARTS course will enable the student to:

1.1 compare and evaluate the various characteristics of good design used in the production of furniture and cabinets.

1.2 solve simulated industrial design or planning problems in the production of a product.

1.3 discuss critically how designing and planning relate to the fabrication of furniture and cabinet in various types of industrial production.

1.4 solve problems related to commercial types and applications of finishes.

2.1 devise, compare and estimate the specific industrial applications or operations necessary for the production in quantity of a particular product made of wood or a related forestry product.

2.2 evaluate the applications of wood technology in

the fabrication of industrial products.

3.1 evaluate the quality of finishing materials.

3.2 exhibit a willingness to solve the technical problem relating to wood technology.

3.3 exhibit a willingness to use safe work habits and to promote safety consciousness.

SUGGESTED TOPICAL OUTLINE:

I. Introduction to Woodworking
   A. Occupations
   B. Safety

II. Design

III. Machine Tools
   A. Planer/Surfacer
   B. Jointer
   C. Circular Saw
   D. Wood Lathe
   E. Sanders
   F. Radial Arm Saw
   G. Shaper
   H. Router
   I. Portable Power Tools

IV. Cabinet Making

V. The Industrial Arts Student Association: Furniture Design Studio and Crafts Guilds

TASK # 37

AREA OF COMPETENCE: Woods Technology II

CONTENT/CONCEPT: Woodworking Occupations

TASK: Acquire a Knowledge of Commercial Woodworking Occupations.

CRITERION REFERENCED MEASURE: Select a number of woodworking occupations and list the following characteristics - probable duration of the occupation, wage or salary to be expected, physical requirements, and the educational level required for the work.

PERFORMANCE GUIDES:

1. Check with the state employment agency.
2. Read the text assignment on woodworking.
3. Observe the class presentations.
4. Observe and participate in any possible field trips to construction sites, furniture factories, cabinet makers, tool and die makers, boat builders, or other locations.

TASK # 38

AREA OF COMPETENCE: Woods Technology II

CONTENT/CONCEPT: Safety

TASK: Acquire a Knowledge of General Lab Safety.

CRITERION REFERENCED MEASURE: List and explain the general lab safety rules.

PERFORMANCE GUIDES:

1. Read the text assignment on safety.
2. Observe class presentations.
3. Participate in class discussions.
4. Always practice safety rules.
5. List the safety rules for a woodworking laboratory.

TASK # 39

AREA OF COMPETENCE: Woods Technology II

CONTENT/CONCEPT: Design

TASK: Acquire a Knowledge of Design.

CRITERION REFERENCED MEASURE: Demonstrate an understanding of design principles including line, shape, mass, color, tone, texture, proportion, balance, harmony, rhythm, and symmetry.

PERFORMANCE GUIDES:

1. Read the text assignment on design.
2. Observe class presentations.
3. Practice drawing or sketching objects using the listed design principles.
4. Use good design principles in planning projects.

TASK # 40

AREA OF COMPETENCE: Woods Technology II

CONTENT/CONCEPT: Common Cuts

TASK: Acquire a Knowledge of the Common Machine Cuts.

CRITERION REFERENCED MEASURE: Demonstrate a knowledge of the common machine cuts including a groove or plough, dado, rabbet, chamfer, bevel, miter, taper, mortise and tenon.

PERFORMANCE GUIDES:

1. Read the text assignment on common cuts.
2. Observe class presentations.
3. Participate in class discussions.
4. Observe the training film on wood cuts.
5. Practice making common cuts.

TASK # 41

AREA OF COMPETENCE: Woods Technology II

CONTENT/CONCEPT: Machine Tools

TASK: Develop Skill in Using the Planer/Surfacer.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the planer/surfacer and list the parts including - cutting feed selector handle, table, elevating hand wheel, infeed roll, chip breaker, cutterhead, gib, knife, pressure bar, and outfeed roll.

PERFORMANCE GUIDES:

1. Read the text assignment on the planer/surfacer.
2. List the safety precautions for the planer/surfacer.
3. Observe the class presentations.
4. Take part in class discussions.
5. Practice identifying the parts of the planer/surfacer.
6. Read the operating instructions for the planer/surfacer.
7. Observe training films on the operation of the planer/surfacer.

TASK # 42

AREA OF COMPETENCE: Woods Technology II

CONTENT/CONCEPT: Machine Tools

TASK: Develop Skill in Using the Jointer.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the jointer including identifying the following parts - in feed table, out feed table, guard, fence, fence adjusting handle, front table adjusting wheel, rear table adjusting wheel, depth of cut scale, and switch.

PERFORMANCE GUIDES:

1. Read the text assignment on the jointer.
2. Read the operating instructions on the jointer.
3. List the safety precautions for the jointer.
4. Observe class presentations.
5. Take part in class discussions.
6. List the parts of the jointer.
7. Observe the training film on jointer operation.
8. Practice using the jointer.

TASK # 43

AREA OF COMPETENCE: Woods Technology II

CONTENT/CONCEPT: Machine Tools

TASK: Develop Skill in Using the Circular Saw.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the circular saw including the following cuts - bevel, chamfer, taper, miter, groove, dado, rabbet, tenon, tongue and groove.

PERFORMANCE GUIDES:

1. Read the text assignment on the circular saw.
2. Read the operating instructions for the circular saw.
3. List the safety precautions for the circular saw.
4. Observe the class presentations.
5. Take part in class discussions.
6. Practice identifying the parts.
7. Observe the training film on circular saw cuts.
8. Practice using the circular saw.

TASK # 44

AREA OF COMPETENCE: Woods Technology II

CONTENT/CONCEPT: Wood-turning Tools

TASK: Acquire a Knowledge of Wood-turning Tools.

CRITERION REFERENCED MEASURE: Demonstrate a knowledge of wood-turning tools including a skew, gouge, spear point, flat nose, round nose, and parting tool.

PERFORMANCE GUIDES:

1. Read the text assignment on wood-turning tools.
2. Observe the class presentations.
3. Participate in class discussions.
4. Make a list of the tools and their purposes.
5. Sharpen the tools for lathe use.

TASK # 45

AREA OF COMPETENCE: Woods Technology II

CONTENT/CONCEPT: Machine Tools

TASK: Develop Skill in Using the Wood Lathe.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the wood lathe and describe the parts including - the head stock, indexing pin, tool rest base, tool rest, lathe bed, tail stock, tail stock spindle clamp, set over screw, hand wheel, drive center, headstock cone pulley, and adjustable center pin.

PERFORMANCE GUIDES:

1. Read the text assignment on the lathe.
2. Observe class presentations.
3. Read the lathe operating instructions.
4. Participate in class discussions.
5. Practice identifying the parts.
6. List the lathe operating safety precautions.
7. Observe training films on lathe operation.
8. Practice using the lathe.

TASK # 46

AREA OF COMPETENCE: Woods Technology II

CONTENT/CONCEPT: Machine Tools

TASK: Develop Skill in Using the Oscillating Spindle Sander.

CRITERION REFERENCED MEASURE: Demonstrate the safe and correct operation of the oscillating spindle sander.

PERFORMANCE GUIDES:

1. Read the text assignment.
2. Observe the class demonstrations.
3. Take part in class discussions.
4. Practice using the sander.

TASK # 47

AREA OF COMPETENCE: Woods Technology II

CONTENT/CONCEPT: Machine Tools

TASK: Develop Skill in Using the Radial Arm Saw.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the radial arm saw and identify the following parts - in-feed table, out-feed table, guard, fence, fence adjusting handle, front table adjusting wheel, rear table adjusting wheel, depth of cut scale, and switch.

PERFORMANCE GUIDES:

1. Read the text assignment.
2. Read the operating instructions on the radial arm saw.
3. List the safety precautions for the radial arm saw.
4. Observe class presentations.
5. Take part in class discussions.
6. Practice identifying the parts of the radial arm saw.
7. Observe the training film on radial arm saw operation.
8. Practice using the radial arm saw.

TASK # 48

AREA OF COMPETENCE: Woods Technology II

CONTENT/CONCEPT: Machine Tools

TASK: Develop Skill in Using the Shaper.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the shaper including identifying the following parts - spindle, 3-knife safety cutterhead, miter gage and sliding jig groove, expension wing, table, spindle raising wheel, and wheel lock.

PERFORMANCE GUIDES:

1. Read the text assignment on the shaper.
2. Read the operating instructions for the shaper.
3. List the safety precautions for the shaper.
4. Observe the class presentations.
5. Practice identifying the parts.
6. Take part in class discussions.
7. Observe the training film on shaper operation.
8. Practice using the shaper.

TASK # 49

AREA OF COMPETENCE: Woods Technology II

CONTENT/CONCEPT: Machine Tools

TASK: Develop Skill in Using the Router.

CRITERION REFERENCED MEASURE: Demonstrate edge moulding, dove tailing, and dadoing skills with the router.

PERFORMANCE GUIDES:

1. Read the text assignment on the router.
2. Observe the class presentations.
3. Participate in class discussions.
4. Observe the training film on router operations.
5. Practice using the router.

TASK # 50

AREA OF COMPETENCE: Woods Technology II

CONTENT/CONCEPT: Machine Tools

TASK: Develop Skill in Using the Belt and Disc Sander.

CRITERION REFERENCED MEASURE: Safely rough sand stock using the belt and disc sander.

PERFORMANCE GUIDES:

1. Read the text assignment on the belt and disc sander.
2. Observe the class presentations.
3. Participate in class discussions.
4. List the safety precautions for the belt and disc sander.
5. Practice using the belt and disc sander.

TASK # 51

AREA OF COMPETENCE: Woods Technology II

CONTENT/CONCEPT: Power Tools

TASK: Develop Skill in Using the Portable Circular Saw.

CRITERION REFERENCED MEASURE: Plunge cut, bevel cut, rip, and cross cut using the portable circular saw.

PERFORMANCE GUIDES:

1. Read the text assignment on the portable circular saw.
2. Observe the class presentations.
3. Take part in class discussions.
4. Practice using the portable circular saw.

TASK # 52

AREA OF COMPETENCE: Woods Technology II

CONTENT/CONCEPT: Cabinet Making

TASK: Acquire a Knowledge of Cabinet Construction.

CRITERION REFERENCED MEASURE: Describe cabinet construction including case construction, leg and rail construction, carcass construction, drawer construction, and built-ins.

PERFORMANCE GUIDES:

1. Read the text assignment on cabinet making.
2. Observe the class presentations.
3. Take part in class discussions.
4. List the different types of construction.
5. Participate in possible field trips.

TASK # A.I.A.S.A.

AREA OF COMPETENCE: Woods Technology II

CONTENT/CONCEPT: In Class Industrial Arts Student Association

TASK: Participation (involvement) in a democratic organization with activities using course content.

CRITERION REFERENCED MEASURE: Participate with other students in organized activities using industrial resources, leadership or followership, service or enterprise projects and recognition for workmanship.

PERFORMANCE GUIDES:

1. Organize class into personnel system for democratic decision making and leader/follower development.
2. Invite speakers to class and use resources of industry and technology from the community.
3. Carry out worthy group activities and projects to improve or serve school or community.
4. Operate an enterprise system to produce item of economic value.
5. Encourage competition in areas of course to motivate and recognize achievement.

NOTE: These performance guides are expanded in the publication titled Student Association Activities in Industrial Arts Instruction available from the Industrial Arts Service, Virginia Department of Education, Richmond, Virginia 23216.

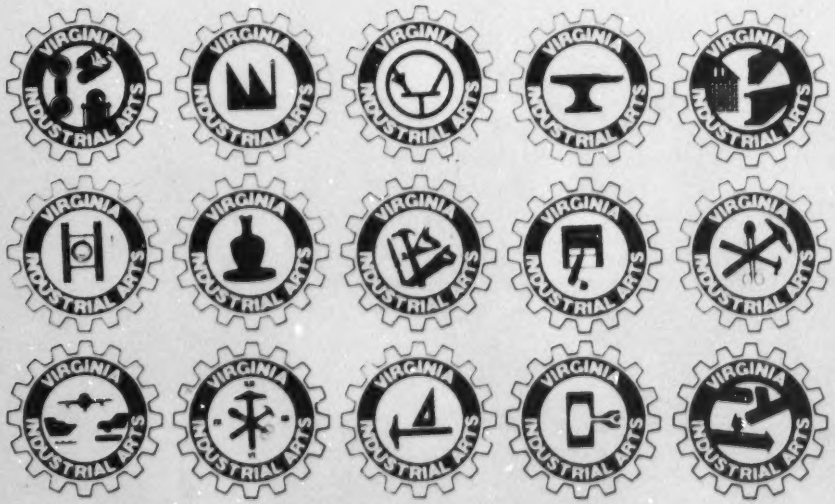
A CATALOG OF TASKS

FOR

COMPETENCY-BASED INSTRUCTION

IN

General Industrial Arts I & II



Industrial Arts Education Service
Department of Education
Commonwealth of Virginia
Richmond, Virginia 23216
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This Catalog of Tasks
Was Prepared At
Virginia State College
Department of Industrial Arts and Vocational-Industrial Education
By
Rayford L. Harris, Project Director
Presley Jones, Research Assistant

Members of the Advisory Committee
Who Supervised This Curriculum Development
Project Included

David I. Joyner, Co-Chairman, Old Dominion University
John M. Ritz, Co-Chairman, Old Dominion University
George Willcox, State Department of Education
Rodney Fulton, Roanoke
R. Edgar Thacker, Fairfax County
Michael H. Poyner, Chesapeake
Morris A. Gordon, Petersburg
Richard Haas, Fairfax County
Robert Warren, Roanoke County

For further information concerning this
competency catalog write to
Industrial Arts Education Service
Division of Vocational Education, Department of Education
P.O. Box 6Q, Richmond, Virginia 23216

INTRODUCTION

In the summer of 1977, The Industrial Arts Curriculum K-12 was introduced. This plan outlined the preferred courses, course sequences, and purposes which should be addressed in Virginia industrial arts programs. However, the model curriculum plan did not establish exact knowledge, skills, and attitudes which all learners should possess as they exit particular programs.

The purpose of the following competency catalog of tasks is to establish a basis for program content selection and criterion levels from which one may measure to see if individual learners have achieved a minimal level of competence through study in a particular course. In this manner a means to improve education and its accountability to citizenry can be designed based upon the identification and attainment of prespecified outcomes for the industrial arts content area. Although this catalog is designed and presented in a sequencial order of task statements, it does not mean that it must be structured into local programs in this order. Individual instructors may choose to restructure the sequence of competency tasks to meet local needs.

In preparing this catalog considerable research and validation was undertaken to specify those minimal tasks which every learner enrolling in the course should be able to perform. The format of this and other catalogs includes the following areas: area of competence, content/concept, task, criterion referenced measure, and performance guides. The area of competence identifies the industrial arts course for which the particular task was prepared. Content/concept identifies the sub-area with which the particular task is associated. The task is the knowledge, skills or attitudes which the learner should possess after instruction in the industrial arts class. Criterion references measures are means to identify if the learner can successfully perform the stated task and finally, performance guides are sub-tasks which lead to the development of the knowledge, skills and attitudes

identified in the tasks. These areas are illustrated in Table 1. It should be noted that performance objectives have been omitted from the catalogs of tasks. This was done to allow individual instructors to develop objectives they see necessary to meet the local learning environment.

In Table 2 is identified the location of this course in the total program of industrial arts for Virginia. Other competency catalogs are contained in this publication and the remaining catalogs may be obtained from the Industrial Arts Education Service, Division of Vocational Education, Department of Education, P.O. Box 6Q, Richmond, Virginia 23216.

FORMAT DESCRIPTION

AREA OF COMPETENCE: Identifies the industrial arts course for which the particular task was prepared.

CONTENT/CONCEPT: Identifies the sub-area which the particular task is associated.

TASK: Identifies the knowledge, skills, or attitudes which the learner should possess after completing instruction in the industrial arts class.

CRITERION REFERENCED MEASURE: The means to identify if the learner can successfully perform the stated task.

PERFORMANCE GUIDES: Identifies sub-tasks which lead to the development of the knowledge, skills, and attitudes identified in the tasks.

TABLE 1

The Industrial Arts Curriculum

Level	Goal	Program
Elementary School	Learning Reinforcement	Industrial Arts activities integrated within the elementary curriculum
Middle or Junior High School	Orientation and Exploration	Exploring Technology Modern Industry Construction Manufacturing
High School	Technical	Communication Technology Materials and Processes Technology Power and Transportation Technology Architectural Drawing Basic Technical Drawing Electricity and Electronics Energy and Power Engineering Drawing Graphic Communications Metals Technology Woods Technology
	Personal Enrichment	■ General Industrial Arts Industrial Crafts

TABLE 2

GENERAL INDUSTRIAL ARTS I

COURSE DESCRIPTION:

Students plan, design and make projects that show how materials, tools, and processes form the basics of modern industry and technology. Basic skills are developed in technical sketching, woods, metals, and plastics. Emphasis is on the importance of industry and technology to the American way of life.

COURSE GOALS:

Experiences and activities of this INDUSTRIAL ARTS course will enable the student to:

1.1 identify a number of examples which show how one local industry depends upon another.

1.2 describe the importance of individual contributions to an organized production system.

1.3 name common tools and machines used in the production of a simple product.

2.1 plan for the production of a simple product or project.

2.2 perform in a safe manner the operations with tools and materials which are needed to produce a basic project.

2.3 develop a greater eye-hand coordination.

3.1 show awareness of the importance of learning about industry and technology.

3.2 exhibit an appreciation for a job well done.

SUGGESTED TOPICAL OUTLINE:

I. Technical Sketching and Design

II. Woodworking

III. Metalworking

IV. Plastics

V. The Industrial Arts Student Association

TASK # 1

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Technical Sketching and Design

TASK: Develop Skills in Measuring.

CRITERION REFERENCED MEASURE: Demonstrate skills in measuring in both the Metric System and the English System.

PERFORMANCE GUIDES:

1. Read assignment on measuring.
2. Practice using a scale by measuring a line in:
   a. Centimeters
   b. Millimeters
   c. Inches
   d. 1/2 inches
   e. 1/4 inches
   f. 1/8 inches
   g. 1/16 inches
3. Take part in class discussions.
4. Observe class presentations.
5. Observe film/film strip about the metric system.

TASK # 2

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Technical Sketching and Design

TASK: Develop Skills in the Meanings and Use of Lines.

CRITERION REFERENCED MEASURE: Identify and describe the meanings of lines and their uses.

PERFORMANCE GUIDES:

1. Read assignments on lines and their meanings.
2. Practice drawing:
   a. Construction lines
   b. Border lines
   c. Center lines
   d. Extension lines
   e. Dimension lines
   f. Object, visible or outline lines
3. Take part in class discussions.
4. Observe class presentations.

TASK # 3

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Technical Sketching and Design

TASK: Develop Skills in Freehand Drawing and Sketching.

CRITERION REFERENCED MEASURE: Demonstrate skills in freehand drawing and sketching by the use of arm movements.

PERFORMANCE GUIDES:

1. Read assignment on freehand drawing and sketching.
2. Observe a demonstration of freehand drawing and sketching.
3. Practice freehand drawing and sketching:
   a. Horizontal lines
   b. Vertical lines
   c. Sloping or inclined lines
   d. Squares or rectangles
   e. A circle
   f. An oval
   g. A hexagon
   h. An octagon
   i. An isometric drawing
4. Take part in class discussions.

TASK # 4

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Technical Sketching and Design

TASK: Develop Skill Making and Using Gothic Letters.

CRITERION REFERENCED MEASURE: Demonstrate skill in making and using gothic letters as used in drawing projects utilizing horizontal, curved, straight, slanted, and vertical strokes.

PERFORMANCE GUIDES:

1. Read assignment on gothic letters.
2. Observe the class presentations.
3. Practice making gothic letters by using:
   a. Vertical and/or horizontal strokes to make E, F, H, I, L, and T.
   b. Vertical, horizontal, and slant strokes to make A, K, M, N, V, W, X, Y, and Z.
   c. Straight and curved strokes to make B, C, D, G, J, O, Q, R, S, and U.
4. Take part in class discussions.

TASK # 5

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Technical Sketching and Design

TASK: Develop Skills in the Use of Dimensions.

CRITERION REFERENCED MEASURE: Demonstrate skills in the use of dimensions for drafting.

PERFORMANCE GUIDES:

1. Read assignment on the use of dimensions.
2. Practice the use of size dimensions.
3. Practice the use of position and location dimensions.
4. Observe class presentations.
5. Observe movie or film strips presentation.
6. Take part in class discussions.

TASK # 6

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Technical Sketching and Design

TASK: Develop Skills in the Identification and Use of Symbols and Conventions in Drawing.

CRITERION REFERENCED MEASURE: Demonstrate skills in identifying and using symbols and conventions to shorten drawing time.

PERFORMANCE GUIDES:

1. Read assignment on symbols and conventions.
2. Observe class presentations.
3. Take part in a discussion on symbols and conventions.
4. Practice making a drawing using:
   a. Symbols
   b. Conventional breaks

TASK # 7

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Technical Sketching and Design

TASK: Develop Skills in the Identification and Use of Drawing Tools.

CRITERION REFERENCED MEASURE: Identify, and demonstrate the use of, basic drawing tools including the drawing board, T-square, 30-60 degree triangle, 45 degree triangle, architects scale, compass, dividers, erasing shield, and types of pencils.

PERFORMANCE GUIDES:

1. Read assignment on drawing tools.
2. Learn the names and be able to identify basic drawing tools.
3. Observe demonstrations of the correct use of basic drawing tools.
4. Practice the correct usage of:
   a. Drawing board
   b. T-square
   c. 30-60 degree triangle
   d. 45 degree triangle
   e. Architects scale
   f. Compass
   g. Dividers
   h. Erasing shield
   i. Types of pencils

TASK # 8

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Technical Sketching and Design

TASK: Develop Skills in the Making of One-View Drawing.

CRITERION REFERENCED MEASURE: Demonstrate skill in making a one-view drawing to show only single side of object.

PERFORMANCE GUIDES:

1. Read assignment on one-view drawings.
2. Observe demonstration of examples of one-view drawings.
3. Practice making one-view drawings.
4. Take part in class discussions.

TASK # 9

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Technical Sketching and Design

TASK: Develop Skills in Geometric Construction.

CRITERION REFERENCED MEASURE: Demonstrate basic skills in the use of geometric construction in drawing.

PERFORMANCE GUIDES:

1. Read assignment on geometric construction.
2. Observe demonstrations of hexagon, octagon and eliptical drawing.
3. Practice drawing a hexagon, an octagon, and an ellipse.
4. Take part in class discussions.

TASK # 10

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Technical Sketching and Design

TASK: Develop Skills in Orthographic Projection.

CRITERION REFERENCED MEASURE: Demonstrate skill in showing three different views by using orthographic projection.

PERFORMANCE GUIDES:

1. Read assignment on orthographic projection.
2. Observe a demonstration of an orthographic projection drawing.
3. Practice orthographic projection by making a drawing showing size and shape from:
   a. Front
   b. Top
   c. Right side
4. Participate in class discussions.

TASK # 11

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Technical Sketching and Design

TASK: Develop Knowledge in the Use of Auxiliary and Sectional Views.

CRITERION REFERENCED MEASURE: Describe the use of full and/or half sectional views and auxiliary views.

PERFORMANCE GUIDES:

1. Read assignment on auxiliary and sectional views.
2. Observe demonstrations of auxiliary and sectional views.
3. List and describe uses for auxiliary and sectional views.
4. Practice making auxiliary and sectional views.
5. Take part in class discussions.

TASK # 12

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Technical Sketching and Design

TASK: Develop Skills in the Use of Oblique Drawings.

CRITERION REFERENCED MEASURE: Demonstrate skills in the use of cavalier and/or cabinet oblique drawings.

PERFORMANCE GUIDES:

1. Read assignment on oblique drawing.
2. Observe a demonstration of oblique drawing.
3. Practice making an oblique drawing.
4. Take part in class discussions.

TASK # 13

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Technical Sketching and Design.

TASK: Develop Skills in the Use of Isometric Drawings.

CRITERION REFERENCED MEASURE: Demonstrate skills in the use of isometric drawings using both isometric and nonisometric lines.

PERFORMANCE GUIDES:

1. Read assignment on isometric drawings.
2. Observe demonstration on isometric drawing.
3. Practice making a simple isometric drawing.
4. Participate in class discussions.

TASK # 14

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Technical Sketching and Design

TASK: Develop Skills in Pattern Development.

CRITERION REFERENCED MEASURE: Demonstrate skills in direct, parallell-line, radial-line, and triangular pattern development.

PERFORMANCE GUIDES:

1. Read assignment on pattern development.
2. Observe demonstrations of pattern development using:
   a. Direct
   b. Parallel-line
   c. Radial-line
   d. Triangular
3. Practice pattern development using:
   a. Direct
   b. Parallel-line
   c. Radial-line
   d. Triangular
4. Take part in class discussions.

TASK # 15

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Technical Sketching and Drawing

TASK: Develop Skills in Shop Drawing Reproduction.

CRITERION REFERENCED MEASURE: Demonstrate skills in shop drawing reproduction using dry and/or moist diazo.

PERFORMANCE GUIDES:

1. Read assignment on reproducing shop drawings.
2. Observe demonstration of reproducing shop drawings using dry and/or moist diazo.
3. Practice making a reproduction of a shop drawing using dry and/or moist diazo.
4. Plan a project and reporduce its drawings.
5. Take part in class discussions.

TASK # 16

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: List and Describe Methods of Safety Used in the Woodworking Areas.

CRITERION REFERENCED MEASURE: Identify basic methods of safety in the areas where woodworking is being done.

PERFORMANCE GUIDES:

1. Read assignment on safety.
2. Take part in group discussions on safety.
3. Observe all demonstrations on the safe use of machinery.
4. Pass written and operational tests on safety.
5. Design and produce an appropriate safety poster.

TASK # 17

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Identify Woods to be Used in Woodworking.

CRITERION REFERENCED MEASURE: Describe characteristics and types of woods used in woodworking.

PERFORMANCE GUIDES:

1. Read assignment on kinds of woods.
2. Observe samples of woods used in woodworking.
3. Identify basic woods used in woodworking.
4. Take part in class discussions of wood characteristics.

TASK # 18

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Develop Skills in the Selection and Purchase of Lumber.

CRITERION REFERENCED MEASURE: Demonstrate basic skills needed in the selection and purchase of lumber.

PERFORMANCE GUIDES:

1. Read assignment on the selection and purchase of lumber.
2. Observe demonstration in selecting lumber.
3. Take part in discussion on selection and purchase of lumber.
4. Describe some faults found in lumber such as cracks, checks, knots, twisting and warping.

TASK # 19

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Develop Skills Measuring Board Footage.

CRITERION REFERENCED MEASURE: Demonstrate skills needed to measure board footage.

PERFORMANCE GUIDES:

1. Read assignment on board footage.
2. Observe the class presentations.
3. Participate in class discussions.
4. Practice determining board foot measure when planning a project.

TASK # 20

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Describe the Characteristics of Plywood, Hardboard, and Fiberboard.

CRITERION REFERENCED MEASURE: Characterize plywood, hardboard, and fiberboard in terms of construction, size, availability, and uses.

PERFORMANCE GUIDES:

1. Read the text assignment on processed woods.
2. Observe class presentations.
3. Participate in field trip to wood processing plant.
4. Collect samples of processed woods.
5. List characteristics and uses of processed woods.

TASK # 21

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Develop Skills with Tools for Measuring and Laying-Out Lumber.

CRITERION REFERENCED MEASURE: Demonstrate the basic skills required to use tools for measuring and laying out lumber.

PERFORMANCE GUIDES:

1. Read assignment on tools used in measuring and laying-out lumber.
2. Observe demonstration of measuring and laying out lumber.
3. Practice using all of the measuring and laying out tools.
4. Use the measuring and laying out tools in the planning and construction of a project.

TASK # 22

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Developing Hand Sawing Skills.

CRITERION REFERENCED MEASURE: Demonstrate skills required to use hand saws.

PERFORMANCE GUIDES:

1. Read assignment on the use of hand saws.
2. Observe demonstration in the proper use of hand saws.
3. Practice using hand saws.
4. List the correct hand saws to be used for specific functions such as cutting small circles, cutting off a length of 2" x 4" piece of wood, cutting down the length of a piece of wood, cutting at 45 degree and 90 degree angles, and cutting holes in a board.

TASK # 23

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Develop Skills in the Use of Hand Planes.

CRITERION REFERENCED MEASURE: Demonstrate the basic skills in the use of hand planes.

PERFORMANCE GUIDES:

1. Read assignment on hand planes.
2. Observe demonstration in the use of hand planes.
3. Practice using hand planes.
4. Take part in class discussions.
5. Observe film on planes.

TASK # 24

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Develop Skills with Boring and Drilling with Hand Tools.

CRITERION REFERENCED MEASURE: Demonstrate basic skills required to use hand tools used for boring and drilling.

PERFORMANCE GUIDES:

1. Read assignment on the use of hand tools used for boring and drilling.
2. Observe a demonstration of hand tools for boring and drilling.
3. Select proper drilling bits for selected jobs.
4. Observe film/film strip on boring and drilling.
5. Take part in class discussions.
6. Practice boring and drilling with hand tools.

TASK # 25

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Develop Skills in the Use of Fasteners.

CRITERION REFERENCED MEASURE: Demonstrate basic skills in the use of wood screws and nails as fasteners.

PERFORMANCE GUIDES:

1. Read assignment on the use of fasteners.
2. Observe a demonstration of the use of fasteners.
3. Practice using the following fasteners:
   a. Wood screws
   b. Nails

TASK # 26

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Develop Skills in the Making of Basic Joints.

CRITERION REFERENCED MEASURE: Demonstrate skills required to make a basic joint including the dado, rabbet, lap, and miter.

PERFORMANCE GUIDES:

1. Read assignment on basic joints.
2. Observe a demonstration on basic joint construction.
3. Observe film/film strip on basic joint construction.
4. Practice making joints.

TASK # 27

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Develop Skills Gluing and Clamping.

CRITERION REFERENCED MEASURE: Demonstrate the basic skills for gluing and clamping wood.

PERFORMANCE GUIDES:

1. Read assignment on gluing and clamping wood.
2. Observe a demonstration of gluing and clamping wood.
3. Observe film/film strip on gluing.
4. Practice gluing using different clamps.

TASK # 28

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Develop Skills in Mounting Basic Hardware.

CRITERION REFERENCED MEASURE: Demonstrate skills used in mounting basic hardware used in woodworking.

PERFORMANCE GUIDES:

1. Read assignment on mounting hardware.
2. Observe a demonstration in the proper means of mounting hardware.
3. Take part in class discussions.
4. List several types of hardware and the uses for them.

TASK # 29

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Develop Skills in Sawing with the Radial Arm Saw.

CRITERION REFERENCED MEASURE: Demonstrate the basic skills used in sawing with a radial arm saw.

PERFORMANCE GUIDES:

1. Read assignment on the use of the radial arm saw.
2. Observe a demonstration in the use of the radial arm saw.
3. Practice using the radial arm saw.
4. Take part in class discussions.
5. Observe film/film strip on using the radial arm saw.
6. List safety precautions.

TASK # 30

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Develop Skills Sawing on the Band Saw.

CRITERION REFERENCED MEASURE: Demonstrate basic skills in sawing on the band saw.

PERFORMANCE GUIDES:

1. Read assignment on the use of the band saw.
2. Observe a demonstration of sawing with the band saw.
3. Observe film/film strip on using the band saw.
4. Take part in class discussions.
5. Practice using the band saw.
6. List safety precautions.

TASK # 31

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Develop Skills Sawing with the Scroll Saw.

CRITERION REFERENCED MEASURE: Demonstrate basic skills sawing with the scroll saw.

PERFORMANCE GUIDES:

1. Read assignment on the scroll saw.
2. See demonstration in the proper use of the scroll saw.
3. Observe film/film strip on using the scroll saw.
4. Take part in class discussions.
5. Practice using the scroll saw.
6. List safety precautions.

TASK # 32

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Develop Skill in Using the Jointer.

CRITERION REFERENCED MEASURE: Demonstrate skills required in the proper use of the jointer.

PERFORMANCE GUIDES:

1. Read assignment on the jointer.
2. Observe the proper use of the jointer for planing.
3. Observe film/film strip on the use of the jointer.
4. Take part in class discussions.
5. Practice using the jointer.
6. List safety precautions.

TASK # 33

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Develop Skills Using the Portable Electric Drill.

CRITERION REFERENCED MEASURE: Demonstrate the proper skills required to use the portable electric drill.

PERFORMANCE GUIDES:

1. Read assignment on the electric drill.
2. Observe a demonstration of the electric drill.
3. Observe film/film strip on using the electric drill.
4. Take part in class discussions.
5. Practice using the electric drill.
6. List safety precautions.

TASK # 34

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Develop Skills in Using the Portable Belt and Orbital Sander.

CRITERION REFERENCED MEASURE: Demonstrate skills in using the belt and orbital sanders properly.

PERFORMANCE GUIDES:

1. Read assignment on belt and orbital sanders.
2. Observe the proper use of the belt and orbital sanders.
3. Observe film/film strip on the use of the belt sander and the orbital sander.
4. Take part in class discussions.
5. Practice using the sanders.
6. List the safety precautions.

TASK # 35

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Develop Skills in the Use of the Wood Lathe.

CRITERION REFERENCED MEASURE: Demonstrate skill in using the wood lathe including chisels, gouges, parting tools, skews, round noses, spear points, calipers, and determining surface speeds.

PERFORMANCE GUIDES:

1. Read assignment on the wood lathe.
2. Observe a demonstration on wood lathe operation.
3. Observe film/film strip on using the wood lathe.
4. Take part in class discussions.
5. List and describe the function of the chisels, gouges, parting tool, skews, round nose, spear point and calipers.
6. Practice using the wood lathe.
7. List safety precautions.

TASK # 36

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Prepare Wood for Finishing.

CRITERION REFERENCED MEASURE: Demonstrate skill in tools used in finishing wood including files, rasps, sandpaper, scrapers, and steel wool.

PERFORMANCE GUIDES:

1. Read assignment on wood finishing.
2. Observe demonstrations on wood finishing.
3. Discuss files, surforms, rasps, sandpaper, scrapers, and steel wool.
4. Practice finishing wood.

TASK # 37

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Select Wood Finishing Materials.

CRITERION REFERENCED MEASURE: Demonstrate ability to choose the proper materials required to finish wood from among mineral spirits, benzene, alcohol, turpentine, linseed oil, varnish, lacquer, enamels and stain.

PERFORMANCE GUIDES:

1. Read assignment on wood finishing materials.
2. Observe demonstration on the select wood finishing materials.
3. Participate in class discussions.
4. Practice selecting finishes that will give desired results.

TASK # 38

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Woodworking

TASK: Develop Skills in Finishing Wood.

CRITERION REFERENCED MEASURE: Demonstrate skills required to properly finish wood including staining, filling, varnishing and painting.

PERFORMANCE GUIDES:

1. Read assignment on finishing wood.
2. Observe demonstration of wood finishing.
3. Practice filling and finishing wood.

TASK # 39

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Safety Attitudes in Metalworking.

CRITERION REFERENCED MEASURE: Demonstrate safety procedures to be used in metalworking.

PERFORMANCE GUIDES:

1. Read assignment on safety.
2. Take part in group discussion on safety in metalwork.
3. List the general safety procedures applicable to the metalworking lab.
4. Practice safety procedures whenever you are in the lab.

TASK # 40

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop a Knowledge of Kinds of Metal.

CRITERION REFERENCED MEASURE: List and describe the kinds of metal used in metalworking including iron, steel, steel alloys, and non ferrous metals such as aluminum, copper, zinc, brass, bronze, silver, gold, tin, lead, and nickel.

PERFORMANCE GUIDES:

1. Read assignment on kinds of metal.
2. Take part in discussion on the various kinds of metals.
3. Observe film/film strip on metal production and standard stock production.
4. List and discuss the ferrous and non-ferrous metals.

TASK # 41

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in Measuring.

CRITERION REFERENCED MEASURE: Demonstrate skills in measuring for metalworking using a one piece metal, a steel tape, a try square, and a framing square.

PERFORMANCE GUIDES:

1. Read assignment on metalwork measuring.
2. Observe demonstrations of measuring.
3. Practice measuring with a one piece metal rule, a steel tape, a try square, and a framing square.
4. Take part in class discussions.

TASK # 42

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in Layingout.

CRITERION REFERENCED MEASURE: Demonstrate skill in using metalworking layout tools including dividers, scribe, prick punch, squares, marking gauges, and the center punch.

PERFORMANCE GUIDES:

1. Read assignment on making a layout.
2. Observe a demonstration of using layout tools.
3. List and describe the function of layout tools used in metalworking.
4. Observe film/film strip about layout.
5. Take part in class discussions.
6. List the safety precautions.

TASK # 43

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills Using Basic Metalworking Hand Tools.

CRITERION REFERENCED MEASURE: Demonstrate skill in the proper use of hand tools including tin snips, balpeen hammers, files, hack saws, cold chisel, and hand drill.

PERFORMANCE GUIDES:

1. Read assignments on proper use of hand tools.
2. Observe a demonstration on the use of
   a. Tin snips
   b. Ballpeen hammers
   c. Files
   d. Hack saws
   e. cold chisel
   f. Hand drill
3. Practice using the above tools.
4. Observe film/film strip about metalworking hand tools.
5. List and describe the function of the above tools.
6. Participate in class discussions.
7. List safety precautions.

TASK # 44

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills Using the Drill Press.

CRITERION REFERENCED MEASURE: Demonstrate skills with the drill press as used in metalworking, including type of bits used, turning speeds, penetration speeds, and safety precautions.

PERFORMANCE GUIDES:

1. Read assignment on the drill press.
2. Observe a demonstration in the proper use of the drill press.
3. Observe film/film strip about the operation of the drill press.
4. List the safety precautions concerned with the drill press.
5. Take part in class discussions.
6. Practice drilling.

TASK # 45

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in the Use of a Portable Electric Drill.

CRITERION REFERENCED MEASURE: Demonstrate the skills required to use a portable electric drill properly for metalworking.

PERFORMANCE GUIDES:

1. Read assignment about the use of portable electric drills.
2. Observe a demonstration in the proper use of the portable electric drill.
3. List safety precautions concerned with the portable electric drill.
4. Participate in class discussions.
5. Observe film/film strip about the portable electric drill.
6. Practice using the drill.

TASK # 46

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills Countersinking.

CRITERION REFERENCED MEASURE: Demonstrate skills in countersinking as used in metalworking including the drill press, breast drill, and hand drill.

PERFORMANCE GUIDES:

1. Read assignment on countersinking.
2. Observe a demonstration of countersinking.
3. Take part in class discussions.
4. Describe conditions when countersinking is used.
5. List safety precautions for countersinking with the drill press, breast drill, and hand drill.

TASK # 47

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Knowledge of Abrasives.

CRITERION REFERENCED MEASURE: List and describe abrasives used in metalworking including rouge, lime, tripoli, crocus, emery and aluminum oxide flow.

PERFORMANCE GUIDES:

1. Read assignment on abrasives.
2. Take part in a group discussion on abrasives and their uses.
3. Observe class presentation on abrasives.
4. List the above abrasives and describe their main use.
5. List safety precautions concerned with using abrasives.

TASK # 48

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills Using the Metal Grinder.

CRITERION REFERENCED MEASURE: Demonstrate skills in the use of the grinder.

PERFORMANCE GUIDES:

1. Read assignment on the use of the grinder in metalwork.
2. Observe a demonstration in the use of the grinder.
3. Participate in class instructions.
4. Practice using the grinder.
5. List safety precautions concerned with using the grinder.

TASK # 49

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills Sharpening Tools.

CRITERION REFERENCED MEASURE: Demonstrate skills required to sharpen tools including dressing and truing grinding wheels, hallow grinding, sharpening the cold chisel, drill, screw driver, and knife edges using grinders, stones and wheels.

PERFORMANCE GUIDES:

1. Read assignment on sharpening tools.
2. Observe demonstration of tool sharpening.
3. Participate in class discussions.
4. Practice sharpening tools.
5. List safety precautions.

TASK # 50

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills Bending and Shaping.

CRITERION REFERENCED MEASURE: Demonstrate skills used in bending and shaping metal including angular bends, circular bends, bending a scroll, and twisting metal.

PERFORMANCE GUIDES:

1. Read assignment on bending and shaping of metal.
2. Observe demonstration of:
   a. Angular bends
   b. Circular bends
   c. Bending a scroll
   d. Twisting metal
3. Practice:
   a. Angular bends
   b. circular bends
   c. Bending a scroll
   d. Twisting a piece of metal
4. Participate in class discussions.
5. List safety precautions.

TASK # 51

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills Planishing.

CRITERION REFERENCED MEASURE: Demonstrate skills in planishing.

PERFORMANCE GUIDES:

1. Read assignment on planishing.
2. Observe demonstration of planishing.
3. Practice planishing using a planishing hammer.

TASK # 52

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in Finishing.

CRITERION REFERENCED MEASURE: Demonstrate skills in finishing metalwork including peening and buffing.

PERFORMANCE GUIDES:

1. Read assignment on metal finishing.
2. Observe demonstration of metal finishing.
3. Practice peening and buffing.
4. Take part in class discussions.
5. List safety precautions.

TASK # 53

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in the Use of Taps and Dies.

CRITERION REFERENCED MEASURE: Demonstrate skills in the proper use of taps and dies for metalworking.

PERFORMANCE GUIDES:

1. Read assignment on taps and dies.
2. Observe a demonstration in the use of taps and dies.
3. Take part in class discussions.
4. Practice using taps and dies.
5. List safety precautions.

TASK # 54

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in the Use of Squaring Shears.

CRITERION REFERENCED MEASURE: Demonstrate skill in the use of squaring shears.

PERFORMANCE GUIDES:

1. Read assignment on the use of squaring shears.
2. Observe a demonstration in the safe use of squaring shears.
3. Practice using the squaring shears.
4. Take part in class discussions.
5. List safety precautions.

TASK # 55

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in the Use of Sheet Metal Stakes.

CRITERION REFERENCED MEASURE: Demonstrate skills in the proper use of sheet metal stakes and bench plate.

PERFORMANCE GUIDES:

1. Read assignment on sheet metal stakes.
2. Observe demonstration in the use of sheet metal stakes.
3. Practice using sheet metal stakes and bench plate.
4. List safety precautions.

TASK # 56

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in the Uses of the Bar Folder.

CRITERION REFERENCED MEASURE: Demonstrate skills in the proper use of the bar folder.

PERFORMANCE GUIDES:

1. Read assignment on the bar folder.
2. Observe a demonstration of the bar folder.
3. Practice using the bar folder.
4. List safety precautions.
5. Participate in class discussions.

TASK # 57

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in the Use of the Box and Pan Brake.

CRITERION REFERENCED MEASURE: Demonstrate skill in the use of the box and pan brake.

PERFORMANCE GUIDES:

1. Read assignment on the box and pan brake.
2. Observe a demonstration of the box and pan brake.
3. Practice using the box and pan brake.
4. List safety precautions.
5. Take part in class discussions.

TASK # 58

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills Making a Grooved Seam.

CRITERION REFERENCED MEASURE: Demonstrate skills required to make a grooved seam.

PERFORMANCE GUIDES:

1. Read assignment on grooved seams.
2. Observe a demonstration on making a grooved seam.
3. Practice making a grooved seam.
4. List safety precautions.

TASK # 59

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in Hand Edge Wiring.

CRITERION REFERENCED MEASURE: Demonstrate skills in the proper method of hand edge wiring.

PERFORMANCE GUIDES:

1. Read assignment on hand edge wiring.
2. Observe a demonstration of hand edge wiring.
3. Practice making a wired edge.
4. Participate in class discussions.
5. List safety precautions.

TASK # 60

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills Riveting.

CRITERION REFERENCED MEASURE: Demonstrate skills in riveting including the use of the solid punch, rivet set, and rivet hammer.

PERFORMANCE GUIDES:

1. Read assignment on riveting.
2. Observe a demonstration of riveting.
3. Practice riveting.
4. Participate in class discussions.
5. List safety precautions.

TASK # 61

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in the Use of Sheet Metal Screws.

CRITERION REFERENCED MEASURE: Demonstrate skills in the use of sheet metal screws.

PERFORMANCE GUIDES:

1. Read assignment on the use of sh t metal screws.
2. Observe a demonstration in the proper use of sheet metal screws.
3. Choose a particular fastening job and select and use the correct type and size of rivets to complete the fastening.
4. Take part in class discussions.
5. List safety precautions.

TASK # 62

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in Spot Welding.

CRITERION REFERENCED MEASURE: Demonstrate skills used in spot welding.

PERFORMANCE GUIDES:

1. Read assignment on spot welding.
2. Observe demonstration of spot welding.
3. Choose a fastening job to do, make the proper setting on the spot welder, and make the weld.
4. Take part in class discussions.
5. List safety precautions.

TASK # 63

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills Soft Soldering.

CRITERION REFERENCED MEASURE: Demonstrate skills required to soft solder.

PERFORMANCE GUIDES:

1. Read assignment on soft soldering.
2. Observe a demonstration of soft soldering.
3. Practice soft soldering.
4. List safety precautions.
5. Participate in class discussions.

TASK # 64

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Knowledge of Annealing and Pickling.

CRITERION REFERENCED MEASURE: Describe the processes of annealing and pickling.

PERFORMANCE GUIDES:

1. Read assignment on annealing and pickling.
2. Take part in group discussion of annealing and pickling.
3. List the steps involved in annealing and pickling.
4. List safety measures concerned.
5. Observe class presentation.

TASK # 65

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in Etching Metal.

CRITERION REFERENCED MEASURE: Demonstrate skills used in etching metal.

PERFORMANCE GUIDES:

1. Read assignment on etching metal.
2. Observe demonstration of etching metal.
3. Practice etching metal.
4. List steps involved in etching metal.
5. List safety precautions.
6. Take part in class discussions.

TASK # 66

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Knowledge of Metal Forging.

CRITERION REFERENCED MEASURE: List and describe the procedures used in metal forging.

PERFORMANCE GUIDES:

1. Read assignment on metal forging.
2. Take part in group discussion concerning metal forging.
3. Observe class presentation.
4. List steps involved in metal forging.
5. List safety precautions.

TASK # 67

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skill Making a Simple Mold.

CRITERION REFERENCED MEASURE: Demonstrate skill in making a simple sand mold.

PERFORMANCE GUIDES:

1. Read assignment on making a simple mold.
2. Observe demonstration on making a simple mold.
3. Take part in class discussions.
4. List steps in the process of making a simple sand mold.
5. Practice ramming a simple mold.
6. List safety precautions.

TASK # 68

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in Making a Casting.

CRITERION REFERENCED MEASURE: Demonstrate skills used in casting metal.

PERFORMANCE GUIDES:

1. Read assignment on casting.
2. Observe a demonstration of casting.
3. Participate in class discussions.
4. List the steps in making a mold casting.
5. Pour a metal casting.
6. Take part in class discussions.
7. List safety precautions.

TASK # 69

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in Lathe Operation.

CRITERION REFERENCED MEASURE: Demonstrate basic skills in the use of a metal lathe.

PERFORMANCE GUIDES:

1. Read assignment on the metal lathe.
2. Observe a demonstration on the use of the lathe.
3. Participate in class discussions.
4. Practice using the lathe.
5. List safety precautions.

TASK # 70

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in Oxyacetylene Welding.

CRITERION REFERENCED MEASURE: Demonstrate skills in the proper method of oxyacetylene welding.

PERFORMANCE GUIDES:

1. Read assignment on oxyacetylene welding.
2. Observe demonstration of oxyacetylene welding.
3. Take part in class discussions.
4. Practice welding.
5. List safety precautions.
6. Describe the pressure settings.
7. Describe carburizing flame.
8. Describe oxidizing flame.
9. Describe neutral flame.

TASK # 71

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in Brazing.

CRITERION REFERENCED MEASURE: Demonstrate skills used in brazing for metalwork.

PERFORMANCE GUIDES:

1. Read assignment on brazing.
2. Observe a demonstration of the proper method of brazing.
3. Participate in class discussions.
4. Practice brazing.
5. List safety precautions.

TASK # 72

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Metalworking

TASK: Develop Skills in Arch Welding.

CRITERION REFERENCED MEASURE: Demonstrate skills in the proper method of arc welding.

PERFORMANCE GUIDES:

1. Read assignment on arch welding.
2. Observe a demonstration of arch welding.
3. Take part in class discussions.
4. Practice welding.
5. List safety precautions.
6. Describe the various current settings and their purpose.

TASK # 73

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Plastics

TASK: Develop Knowledge in the Different Types of Plastics.

CRITERION REFERENCED MEASURE: List and describe the types of plastics and their two general groupings including thermoplastic, thermosetting plastic, acrylic, cellulosic, nylon, polyethylene, phenolic, polyesters, uria, and melamine.

PERFORMANCE GUIDES:

1. Read assignment on types of plastics.
2. Take part in discussion on the uses of each type of plastic.
3. Observe class presentations.
4. List some raw materials for plastic manufacturing.
5. List some raw materials for plastic manufacturing.
6. List safety precautions needed when working with plastic.

TASK # 74

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Plastics

TASK: Develop Skills Transferring Patterns.

CRITERION REFERENCED MEASURE: Demonstrate skills used in transferring patterns on different types of plastics.

PERFORMANCE GUIDES:

1. Read assignment on transferring patterns.
2. Observe a demonstration of pattern transfer.
3. Practice using layout tools including:
   a. Pencil
   b. Scribe
   c. Pencil compass
   d. 2 foot rule
   e. Try square
4. Take part in class discussions.

TASK # 75

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Plastics

TASK: Develop Skills with Tools Used for Sawing Plastics.

CRITERION REFERENCED MEASURE: Demonstrate skills with sawing tools used for cutting plastics to desired shapes and sizes.

PERFORMANCE GUIDES:

1. Read assignment on sawing plastics.
2. Observe demonstrations in the sawing of plastics.
3. Practice sawing plastics using:
   a. Coping saw
   b. Back saw
   c. V block
   d. Band saw
   e. Circular saw
4. List safety precautions.
5. Participate in class discussions.

TASK # 76

AREA OF COMPETENCE: General Industrial ARts I

CONTENT/CONCEPT: Plastics

TASK: Develop Skills with Tools Used for Dressing Edges.

CRITERION REFERENCED MEASURE: Demonstrate skills with tools used for dressing plastic edges.

PERFORMANCE GUIDES:

1. Read assignment on dressing edges.
2. Observe demonstration in the use of tools used for dressing edges.
3. Practice dressing edges using:
   a. Mill file
   b. Block plane
   c. Abrasive paper
   d. Buffer
4. Take part in class discussions.
5. List safety precautions.

TASK # 77

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Plastics

TASK: Develop Skills in Drilling, Tapping, and Threading.

CRITERION REFERENCED MEASURE: Demonstrate skills in drilling, tapping and threading plastics.

PERFORMANCE GUIDES:

1. Read assignment on drilling, tapping and threading.
2. Observe a demonstration of tapping and threading.
3. Practice drilling, threading, and tapping using:
   a. Hand drill
   b. Drill press
   c. Tap and die
3. Take part in class discussions.
4. List safety precautions.

TASK # 78

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Plastics

TASK: Develop Skills with Tools for Decorating Surfaces.

CRITERION REFERENCED MEASURE: Demonstrate basic skills with tools used for decorating surfaces including the awl, dividers, and straightedge.

PERFORMANCE GUIDES:

1. Read assignment on tools used for decorating surfaces.
2. Observe a demonstration of tools used for decorating surfaces.
3. Practice using the following tools:
   a. Awl
   b. Dividers
   c. Straightedge
4. Participate in class discussions.

TASK # 79

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Plastics

TASK: Develop Skills Forming Plastics.

CRITERION REFERENCED MEASURE: Demonstrate skills used in heat free forming of plastics.

PERFORMANCE GUIDES:

1. Read assignment on heat free forming.
2. Observe a demonstration of heat free forming.
3. Take part in class discussions.
4. Practice heat free forming.

TASK # 80

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Plastics

TASK: Develop Skills with Tools Used for Carving.

CRITERION REFERENCED MEASURE: Demonstrate basic skills with tools used for carving plastics including the high speed rotary cutting tool, drills, and burrs.

PERFORMANCE GUIDES:

1. Read assignment on tools used for carving plastics.
2. Observe a demonstration of tools used for carving plastics.
3. Practice using
   a. High speed rotary cutting tool
   b. Drills
   c. Burrs
4. Take part in class discussions.
5. List safety precautions.

TASK # 81

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Plastics

TASK: Develop Skills with Tools Used for Joining Plastics.

CRITERION REFERENCED MEASURE: Demonstrate skills in using tools for joining plastics including the drill press, hand drill, and center punch.

PERFORMANCE GUIDES:

1. Read assignment on tools used for joining plastics.
2. Observe demonstrations of tools used for joining plastics.
3. Practice using the following tools for joining plastics.
   a. Drill press
   b. Hand drill
   c. Center punch
4. Take part in class discussions.
5. List safety precautions.

TASK # 82

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Plastics

TASK: Develop Skills in the Cold Method of Coloring.

CRITERION REFERENCED MEASURE: Demonstrate skills used in coloring plastics by the cold method including dipping and brushing or wiping.

PERFORMANCE GUIDES:

1. Read assignment on coloring plastics.
2. Observe a demonstration of coloring plastics by the cold method.
3. Take part in class discussions.
4. Practice the cold method of plastic coloring using dipping and brushing or wiping.

TASK # 83

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Plastics

TASK: Develop Skills in Injection Molding.

CRITERION REFERENCED MEASURE: Demonstrate skills in injection molding of plastics.

PERFORMANCE GUIDES:

1. Read assignment on injection molding.
2. Observe a demonstration of injection molding.
3. Participate in class discussions.
4. Practice injection molding.
5. List the steps in the injection molding process.
6. List some uses for the injection molding process.

TASK # 84

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Plastics

TASK: Develop Skills in Vacuum Forming.

CRITERION REFERENCED MEASURE: Demonstrate skills in vacuum forming plastics.

PERFORMANCE GUIDES:

1. Read assignment on vacuum forming.
2. Observe a demonstration of vacuum forming plastics.
3. Participate in class discussions.
4. Practice vacuum forming.
5. List the steps involved in vacuum forming.
6. List some uses for vacuum forming.

TASK # 85

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: Plastics

TASK: Develop Skills in Casting

CRITERION REFERENCED MEASURE: Demonstrate skills in casting thermo sets.

PERFORMANCE GUIDES:

1. Read assignment on thermo set casting.
2. Observe a demonstration of thermo set casting.
3. Take part in class discussions.
4. Practice thermo set casting.

TASK # A.I.A.S.A.

AREA OF COMPETENCE: General Industrial Arts I

CONTENT/CONCEPT: In Class Industrial Arts Student Association

TASK: Participation (involvement) in a democratic organization with activities using course content.

CRITERION REFERENCED MEASURE: Participate with other students in organized activities using industrial resources, leadership or followership, service or enterprise projects and recognition for workmanship.

PERFORMANCE GUIDES:

1. Organize class into personnel system for democratic decision making and leader/follower development.
2. Invite speakers to class and use resources of industry and technology from the community.
3. Carry out worthy group activities and projects to improve or serve school or community.
4. Operate an enterprise system to produce item of economic value.
5. Encourage competition in areas of course to motivate and recognize achievement.

NOTE: These performance guides are expanded in the publication titled Student Association Activities in Industrial Arts Instruction available from the Industrial Arts Service, Virginia Department of Education, Richmond, Virginia 23216.

GENERAL INDUSTRIAL ARTS II

COURSE DESCRIPTION:

Students plan, design and construct individual projects in the areas of graphic arts, electricity/ electronics and ceramics. The student is encouraged to select an in depth study area of his or her choice. The value of the American Industry free enterprise system is emphasized.

COURSE GOALS:

Experiences and activities of this INDUSTRIAL ARTS course will enable the student to:

1.1 evaluate methods and processes employed by industry to produce products, conserve our natural resources and protect the environment.

1.2 display proficiency in the evaluation of products in terms of appropriateness of materials, functionality of design as well as quality of construction.

1.3 compare and contrast the types, composition and characteristics of various metals, plastics, woods and ceramics.

2.1 exhibit safe practices in the handling of various materials while utilizing a variety of processes and equipment.

2.2 construct projects utilizing a variety of tools, materials and processes.

2.3 demonstrate problem-solving techniques in the selection of suitable materials for a given use.

3.1 operate equipment, handle materials and utilize processes in a safe and orderly manner.

3.2 exhibit good work habits, respect for and cooperation with associates.

SUGGESTED TOPICAL OUTLINE:

I. Ceramics

II. Graphic Arts

III. Electricity/Electronics

IV. Independent Study in General Industrial Arts

V. The Industrial Arts Student Association

TASK # 86

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Ceramics

TASK: Develop Knowledge of Ceramic Materials.

CRITERION REFERENCED MEASURE: List and describe the basic materials used in ceramics.

PERFORMANCE GUIDES:

1. Read assignment on ceramic materials.
2. Observe a display of ceramic materials.
3. List, describe, and give uses for ceramic materials.
4. Participate in class discussions.

TASK # 87

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Ceramics

TASK: Develop Skills in Designing with Ceramics.

CRITERION REFERENCED MEASURE: Demonstrate skills in ceramic designing.

PERFORMANCE GUIDES:

1. Read assignment on ceramic designing.
2. Observe a demonstration of ceramic design.
3. Practice designing ceramic pieces using simple basic form.
4. Take part in class discussions.
5. Observe film/film strip about ceramic basic design and construction.

TASK # 88

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Ceramics

TASK: Develop Skills in Wedging.

CRITERION REFERENCED MEASURE: Demonstrate skills in wedging clay including mixing, ageing, and wedging.

PERFORMANCE GUIDES:

1. Read assignment on wedging.
2. Observe a demonstration of wedging.
3. Participate in class discussions.
4. Practice wedging and mixing.

TASK # 89

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Ceramics

TASK: Develop Skills Shaping.

CRITERION REFERENCED MEASURE: Demonstrate skills in shaping clay including slab forming, pinching, and coiling.

PERFORMANCE GUIDES:

1. Read assignment on shaping.
2. Observe a demonstration of shaping with a wedged piece of clay by pinching, coiling, and slab forming.
3. Take part in class discussions.
4. Observe film/film strip on ceramic construction.

TASK # 90

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Ceramics

TASK: Develop Skills in Making Molds.

CRITERION REFERENCED MEASURE: Demonstrate skills in ceramic mold construction for slip casting.

PERFORMANCE GUIDES:

1. Read assignment on mold building.
2. Observe a demonstration of mold construction.
3. Take part in class discussions.
4. Practice making plaster molds.

TASK # 91

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Ceramics

TASK: Develop Skills in Casting with Slip Clay.

CRITERION REFERENCED MEASURE: Demonstrate skills in the use of slip for casting.

PERFORMANCE GUIDES:

1. Read assignment on slip and casting.
2. Observe a demonstration of slip casting.
3. Take part in class discussions.
4. Practice mixing and casting slip.
5. List the steps in mixing and casting slip.

TASK # 92

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Ceramics

TASK: Develop Skills in Decorating the Surface of Ceramic Objects.

CRITERION REFERENCED MEASURE: Demonstrate skills in the use of surface decoration.

PERFORMANCE GUIDES:

1. Read assignment on ceramic decoration.
2. Observe a demonstration of ceramic decoration.
3. Practice decorating ceramic pieces by the following methods:
   a. Cutting
   b. Spraying slip
   c. Changing texture
4. Take part in class discussions.
5. Observe film/film strip about ceramic decoration.

TASK # 93

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Ceramics

TASK: Develop Skills in the Use of Glazes.

CRITERION REFERENCED MEASURE: Demonstrate skills in using glazes on ceramics including spraying, dipping, and brushing.

PERFORMANCE GUIDES:

1. Read assignment on the use of glazes.
2. Observe a demonstration in the use of various glazes.
3. Practice glazing by:
   a. Spraying
   b. Dipping
   c. Brushing
4. Participate in class discussions.
5. Observe film/film strip about glazing.

TASK # 94

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Ceramics

TASK: Develop Skills in Firing.

CRITERION REFERENCED MEASURE: Develop skills and knowledge in ceramic firing.

PERFORMANCE GUIDES:

1. Read assignment on firing.
2. Observe demonstration of ceramic firing.
3. Demonstrate skill in both first and second firing.
4. Describe:
   a. Cones
   b. Temperatures
   c. Color

TASK # 95

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Graphic Arts

TASK: Develop a Knowledge of the Types of Printing.

CRITERION REFERENCED MEASURE: List and describe the different types of printing used in graphic arts including photography, screen process, relief, offset, and gravure printing.

PERFORMANCE GUIDES:

1. Read assignment on types of printing.
2. Observe class presentations.
3. Participate in class discussions.
4. List and describe several types of printing.
5. Observe film/film strip about printing.

TASK # 96

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Graphic Arts

TASK: Develop Skills in Composition for Printing.

CRITERION REFERENCED MEASURE: Demonstrate skills in the selection and arrangement of styles of type and design used to make up composition for printing.

PERFORMANCE GUIDES:

1. Read assignment on composition.
2. Observe demonstration of composition.
3. Take part in discussion of composition.
4. Practice the selection of type and layout design.
5. Observe film/film strip about layout design.

TASK # 97

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Graphic Arts

TASK: Develop Skills in Relief Printing.

CRITERION REFERENCED MEASURE: Demonstrate basic skills in relief printing as used in graphic arts.

PERFORMANCE GUIDES:

1. Read assignment on relief printing.
2. Observe a demonstration of relief printing.
3. Practice a form of relief printing (sign press, platen press, linoleum block).
4. Take part in class discussions.
5. Observe film/film strip on relief printing

TASK # 98

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Graphic Arts

TASK: Develop Skills Making a Rubber Stamp.

CRITERION REFERENCED MEASURE: Demonstrate basic skills used in making a rubber stamp.

PERFORMANCE GUIDES:

1. Read assignment on the rubber stamp.
2. Observe a demonstration of a rubber stamp being made.
3. Practice:
   a. Making matrix
   b. Vulcanizing the rubber form
   c. Securing the stamp to the mount
4. Participate in class discussions.

TASK # 99

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Graphic Arts

TASK: Develop Skills Making a Silk Screen Stencil.

CRITERION REFERENCED MEASURE: Demonstrate skills required to make a silk screen stencil.

PERFORMANCE GUIDES:

1. Read assignment on making a silk screen stencil.
2. Observe a demonstration of making a silk screen stencil.
3. List and describe the steps in cutting a stencil.
4. List and describe the steps in adhering the stencil to the screen.
5. Participate in class discussions.

TASK # 100

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Graphic Arts

TASK: Develop Skills Printing by Silk Screening.

CRITERION REFERENCED MEASURE: Demonstrate skill in printing by silk screening for graphic arts.

PERFORMANCE GUIDES:

1. Read assignment on printing silk screens.
2. Observe a demonstration of silk screen printing.
3. Take part in class discussions.
4. Practice silk screen printing in multi-color.

TASK # 101

AREA OF CCMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Graphic Arts

TASK: Develop Skills Exposing Film.

CRITERION REFERENCED MEASURE: Demonstrate skills exposing film with and without a camera.

PERFORMANCE GUIDES:

1. Read assignment on exposing film.
2. Observe a demonstration of exposing film.
3. Take part in class discussions.
4. Practice exposing film using a camera, a pin hole camera, and no camera.

TASK # 102

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Graphic Arts

TASK: Develop Skills Developing Film.

CRITERION REFERENCED MEASURE: Demonstrate skills used in film developing.

PERFORMANCE GUIDES:

1. Read assignment on film development.
2. Observe a demonstration of film developing.
3. Take part in class discussions.
4. List and explain the steps involved in mixing the chemical solution, loading the developing tank, developing, fixing, washing, and drying.
5. Practice the above operations.

TASK # 103

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Graphic Arts

TASK: Develop Skills Printing Pictures.

CRITERION REFERENCED MEASURE: Demonstrate basic skill needed in printing pictures.

PERFORMANCE GUIDES:

1. Read assignment on printing film.
2. Observe a demonstration of film printing.
3. List and describe the steps involved in printing pictures from negatives.
4. Take part in class discussions.
5. Practice printing pictures.

TASK # 104

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Graphic Arts

TASK: Develop Skill in Offset Printing.

CRITERION REFERENCED MEASURE: Demonstrate skill in offset presswork as used in graphic arts.

PERFORMANCE GUIDES:

1. Read assignment on the offset press.
2. Observe a demonstration of:
   a. Preparing the press
   b. Setting up the press for operation
   c. Operating the press.
3. Take part in class discussions.
4. Practice preparing, setting up, and operating the offset press.

TASK # 105

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Graphic Arts

TASK: Develop Skills Binding and Finishing.

CRITERION REFERENCED MEASURE: Demonstrate basic skills used for binding and finishing.

PERFORMANCE GUIDES:

1. Read assignment on binding and finishing.
2. Observe demonstrations of binding and finishing.
3. Take part in class discussions.
4. List and describe the steps in binding and finishing.
5. Practice padding, stitching, and case or mechanical binding.

TASK # 106

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Electricity and Electronics

TASK: Develop Safe Working Habits.

CRITERION REFERENCED MEASURE: Demonstrate safe working habits toward electricity.

PERFORMANCE GUIDES:

1. Read assignment on electrical safety.
2. Take part in safety discussions.
3. Observe good safety habits.
4. Observe class presentations.
5. List and discuss safety practices.
6. Observe film/film strip on safety in the electricity/electronics lab.

TASK # 107

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Electricity and Electronics

TASK: Develop Knowledge of the Atom and Electron.

CRITERION REFERENCED MEASURE: Describe the atom and the electron and their relationship for the use of electricity.

PERFORMANCE GUIDES:

1. Read assignment on the atom and the electron.
2. See demonstration of atoms and electrons.
3. Take part in group discussions on atoms and electrons.
4. Observe film/film strip about atomic structure.

TASK # 108

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Electricity and Electronics

TASK: Develop Knowledge of Magnetism.

CRITERION REFERENCED MEASURE: Describe the effects and the problems of magnetism.

PERFORMANCE GUIDES:

1. Read assignment on magnetism.
2. Take part in group discussions on the effects and problems of magnetism.
3. Observe class presentations.

TASK # 109

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Electricity and Electronics

TASK: Develop a Knowledge of Electric Current.

CRITERION REFERENCED MEASURE: Describe electric current and what is needed to have a complete circuit.

PERFORMANCE GUIDES:

1. Read assignment on electric current.
2. Observe demonstration of electric current.
3. Demonstrate knowledge of basic current with simple examples and circuits.
4. Observe film/film strip about electric current.

TASK # 110

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Electricity and Electronics

TASK: Develop Knowledge of Wire Used in Electrical Work.

CRITERION REFERENCED MEASURE: List and describe wires used in electrical work.

PERFORMANCE GUIDES:

1. Read assignment on electrical wire.
2. Observe examples of electrical wire.
3. Make display of electrical wire.
4. Describe the types and uses of different metals used for wire including copper, aluminum, silver, and gold.
5. Take part in class discussions.
6. Observe class presentations.

TASK # 111

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Electricity and Electronics

TASK: Develop Skills in Making Splices.

CRITERION REFERENCED MEASURE: Demonstrate skills in making splices in electrical wire including the pigtail, branch, and tap splice.

PERFORMANCE GUIDES:

1. Read assignment on splices.
2. Observe demonstration of splicing electrical wire.
3. Take part in class discussions.
4. Practice splicing.

TASK # 112

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Electricity and Electronics

TASK: Develop Knowledge of Electromagnets.

CRITERION REFERENCED MEASURE: Describe the make-up of electromagnets.

PERFORMANCE GUIDES:

1. Read assignment on electromagnets.
2. Observe electromagnet presentation in class.
3. Take part in discussion on electromagnets.

TASK # 113

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Electricity and Electronics

TASK: Develop a Knowledge of Batteries.

CRITERION REFERENCED MEASURE: Describe the characteristics of a primary cell and battery.

PERFORMANCE GUIDES:

1. Read assignment on primary cell and batteries.
2. Observe demonstration on primary cells and batteries.
3. Take part in class discussions.
4. Discuss the primary cell as compared to other cells.
5. Describe the parallel and series connections of cells to form batteries.

TASK # 114

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Electricity and Electronics

TASK: Develop Knowledge of Transformers and Generators.

CRITERION REFERENCED MEASURE: Describe the use of transformers and generators.

PERFORMANCE GUIDES:

1. Read assignment on transformers and generators.
2. Take part in group discussion of transformers and generators.
3. Observe the class presentation on transformers and generators.
4. Observe film/film strip on transformers and generators.
5. List some uses for transformers.

TASK # 115

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Electricity and Electronics

TASK: Develop Skills in Measuring Electricity.

CRITERION REFERENCED MEASURE: Demonstrate the basic skills used in measuring electricity including volts, ohms, and ampheres.

PERFORMANCE GUIDES:

1. Read assignment on measuring electricity.
2. Observe demonstration of how electricity is measured.
3. Practice measuring electricity using a meter.
4. Take part in class discussions.
5. List safety precautions.

TASK # 116

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Electricity and Electronics

TASK: Develop a Knowledge of Electricity in the Home.

CRITERION REFERENCED MEASURE: Describe the use of electricity in the average home.

PERFORMANCE GUIDES:

1. Read assignment on electricity used in the home.
2. Take part in class discussion on electric uses in the home.
3. Observe the class presentation on electricity in the home.
4. List safety precautions concerned with electricity in the home.
5. Observe film/film strip about electricity in the home.

TASK # 117

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Electricity and Electronics

TASK: Develop Skills in Wiring Repair.

CRITERION REFERENCED MEASURE: Demonstrate skills in common house wiring repair.

PERFORMANCE GUIDES:

1. Read assignment on wiring repair.
2. Observe demonstration of house wire repair.
3. Practice repairing home wiring.
4. Take part in class discussions.
5. Observe film/film strip about home electrical repair.
6. List safety precautions.

TASK # 118

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Electricity and Electronics

TASK: Develop Knowledge of Electricity as a Heat Source.

CRITERION REFERENCED MEASURE: Describe how electricity can be used for a source of heat.

PERFORMANCE GUIDES:

1. Read assignment on electrical heat.
2. Take part in discussion on electrical heat.
3. Observe class presentation.
4. List safety precautions.

TASK # 119

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Electricity and Electronics

TASK: Develop a Knowledge of Direct-Current Motors.

CRITERION REFERENCED MEASURE: Describe the operation and use of direct current motors.

PERFORMANCE GUIDES:

1. Read assignment on direct-current motors.
2. Observe demonstration of direct-current motors.
3. Take part in class discussion on direct-current motors.
4. List uses of direct-current motors.
5. Observe film on direct current motors.

TASK # 120

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Electricity and Electronics

TASK: Develop a Knowledge of Alternating-Current Motors.

CRITERION REFERENCED MEASURE: Describe the operation and use of alternating-current motors.

PERFORMANCE GUIDES:

1. Read assignment on alternating-current motors.
2. Observe demonstration on alternating-current motors.
3. Take part in class discussion on alternating-current motors.
4. List uses of alternating-current motors.
5. Observe film on alternating-current motors.

TASK # 121

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: Electricity and Electronics

TASK: Develop Knowledge of the Operation of the Telephone and Telegraph.

CRITERION REFERENCED MEASURE: Describe the operation of the telephone and the telegraph.

PERFORMANCE GUIDES:

1. Read assignment on the telephone and the telegraph.
2. Observe demonstration on the principle parts of the telephone and the telegraph.
3. Take part in discussion on the telephone and telegraph.

TASK # A.I.A.S.A.

AREA OF COMPETENCE: General Industrial Arts II

CONTENT/CONCEPT: In Class Industrial Arts Student Association

TASK: Participation (involvement) in a democratic organization with activities using course content.

CRITERION REFERENCED MEASURE: Participate with other students in organized activities using industrial resources, leadership or followership, service or enterprise projects and recognition for workmanship.

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1. Organize class into personnel system for democratic decision making and leader/follower development.
2. Invite speakers to class and use resources of industry and technology from the community.
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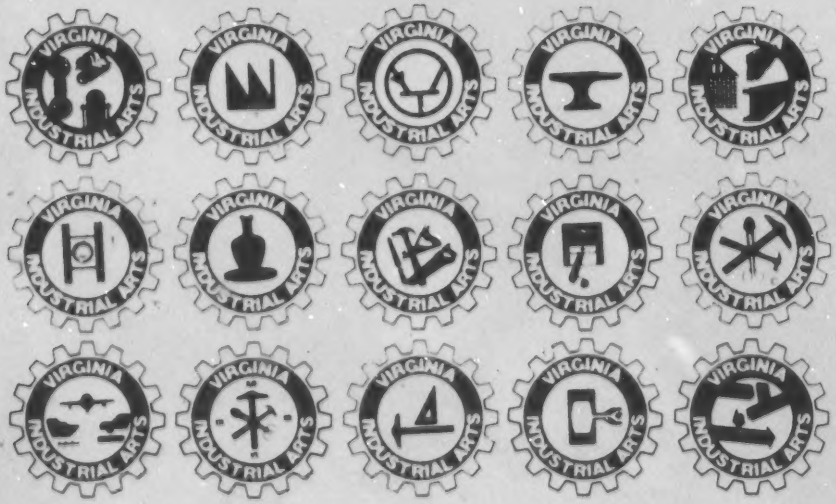
4. Operate an enterprise system to produce item of economic value.
5. Encourage competition in areas of course to motivate and recognize achievement.

NOTE: These performance guides are expanded in the publication titled Student Association Activities in Industrial Arts Instruction available from the Industrial Arts Service, Virginia Department of Education, Richmond, Virginia 23216.

A CATALOG OF TASKS
FOR
COMPETENCY-BASED INSTRUCTION
IN

Industrial Crafts



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Virginia State College
Department of Industrial Arts and Vocational-Industrial Education
By
Rayford L. Harris, Project Director
Presley Jones, Research Assistant

Members of the Advisory Committee
Who Supervised This Curriculum Development
Project Included

David I. Joyner, Co-Chairman, Old Dominion University
John M. Ritz, Co-Chairman, Old Dominion University
George Willcox, State Department of Education
Rodney Fulton, Roanoke
R. Edgar Thacker, Fairfax County
Michael H. Poyner, Chesapeake
Morris A. Gordon, Petersburg
Richard Haas, Fairfax County
Robert Warren, Roanoke County

For further information concerning this
competency catalog write to
Industrial Arts Education Service
Division of Vocational Education, Department of Education
P.O. Box 6Q, Richmond, Virginia 23216

INTRODUCTION

In the summer of 1977, The Industrial Arts Curriculum K-12 was introduced. This plan outlined the preferred courses, course sequences, and purposes which should be addressed in Virginia industrial arts programs. However, the model curriculum plan did not establish exact knowledge, skills, and attitudes which all learners should possess as they exit particular programs.

The purpose of the following competency catalog of tasks is to establish a basis for program content selection and criterion levels from which one may measure to see if individual learners have achieved a minimal level of competence through study in a particular course. In this manner a means to improve education and its accountability to citizenry can be designed based upon the identification and attainment of prespecified outcomes for the industrial arts content area. Although this catalog is designed and presented in a sequencial order of task statements, it does not mean that it must be structured into local programs in this order. Individual instructors may choose to restructure the sequence of competency tasks to meet local needs.

In preparing this catalog considerable research and validation was undertaken to specify those minimal tasks which every learner enrolling in the course should be able to perform. The format of this and other catalogs includes the following areas: area of competence, content/concept, task, criterion referenced measure, and performance guides. The area of competence identifies the industrial arts course for which the particular task was prepared. Content/concept identifies the sub-area with which the particular task is associated. The task is the knowledge, skills or attitudes which the learner should possess after instruction in the industrial arts class. Criterion references measures are means to identify if the learner can successfully perform the stated task and finally, performance guides are sub-tasks which lead to the development of the knowledge, skills and attitudes

identified in the tasks. These areas are illustrated in Table 1. It should be noted that performance objectives have been omitted from the catalogs of tasks. This was done to allow individual instructors to develop objectives they see necessary to meet the local learning environment.

In Table 2 is identified the location of this course in the total program of industrial arts for Virginia. Other competency catalogs are contained in this publication and the remaining catalogs may be obtained from the Industrial Arts Education Service, Division of Vocational Education, Department of Education, P.O. Box 6Q, Richmond, Virginia 23216.

FORMAT DESCRIPTION

AREA OF COMPETENCE: Identifies the industrial arts course for which the particular task was prepared.

CONTENT/CONCEPT: Identifies the sub-area which the particular task is associated.

TASK: Identifies the knowledge, skills, or attitudes which the learner should possess after completing instruction in the industrial arts class.

CRITERION REFERENCED MEASURE: The means to identify if the learner can successfully perform the stated task.

PERFORMANCE GUIDES: Identifies sub-tasks which lead to the development of the knowledge, skills, and attitudes identified in the tasks.

TABLE I

The Industrial Arts Curriculum

Level	Goal	Program
Elementary School	Learning Reinforcement	Industrial Arts activities integrated within the elementary curriculum
Middle or Junior High School	Orientation and Exploration	Exploring Technology Modern Industry Construction Manufacturing
High School	Technical	Communication Technology Materials and Processes Technology Power and Transportation Technology Architectural Drawing Basic Technical Drawing Electricity and Electronics Energy and Power Engineering Drawing Graphic Communications Metals Technology Woods Technology
	Personal Enrichment	General Industrial Arts Industrial Crafts

TABLE 2

INDUSTRIAL CRAFTS

COURSE DESCRIPTION:

Students learn to make attractive and useful personal projects. Students plan and construct projects that involve combinations of several different crafts and a variety of materials and tools. Encouragement is given to finding an appropriate avocation from the crafts of metals and jewelry making, woodworking, leatherwork and ceramics.

COURSE GOALS:

Experiences and activities of this INDUSTRIAL ARTS course will enable the student to:

1.1 identify the raw materials necessary to produce a project in a selected craft area.

1.2 identify the different methods of separating, forming, machining, assembling and finishing materials.

2.1 demonstrate the ability to plan and construct a useful personal project.

2.2 exhibit safe work practices with the common tools, machines and materials of the craft areas studied.

2.3 demonstrate problem-solving techniques in the selection of suitable materials for a given use.

3.1 exhibit good work habits, respect for and

cooperation with others.

3.2 express a positive attitude toward avocational opportunities.

3.3 operate equipment, handle materials and utilize processes in a safe and orderly manner.

3.4 exhibit creative design and pride in work well done.

SUGGESTED TOPICAL OUTLINE:

I. Designing and Planning

II. Weaving

III. Leathercraft

IV. Wood Craft

V. Ceramics

VI. Metal Craft

VII. The Industrial Arts Student Association

TASK # 1

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Design

TASK: Develop a Knowledge of Types of Designs.

CRITERION REFERENCED MEASURE: List types of the following designs: decorative design, commercial design, creative design, industrial design, architectural design, and styling.

PERFORMANCE GUIDES:

1. Read assignment on designs.
2. List and describe some of the following:
   a. Decorative design
   b. Commercial design
   c. Creative design
   d. Industrial design
   e. Architectural design
   f. Styling

TASK # 2

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Design

TASK: Develop Knowledge of the Basic Principles of Design.

CRITERION REFERENCED MEASURE: Demonstrate the basic principles of design in creating and constructing projects.

PERFORMANCE GUIDES:

1. Read assignment on design principles.
2. Study types of designs.
3. Demonstrate basic knowledge of design by incorporating each of the following in the creative design of a product:
   a. Function
   b. Selection of material
   c. Shaping
   d. Proportioning
   e. Balance
4. Participate in class discussions.

TASK # 3

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Design

TASK: Develop Skill in Sketching.

CRITERION REFERENCED MEASURE: Demonstrate skill in making thumbnail sketches and pictorial sketches.

PERFORMANCE GUIDES:

1. Read assignment on making sketches.
2. Observe class presentation.
3. Demonstrate ability to make a thumbnail sketch of various objects.
4. Develop thumbnail sketches into pictorial sketches.

TASK # 4

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Design

TASK: Develop Skill in Reducing or Enlarging a Drawing.

CRITERION REFERENCED MEASURE: Demonstrate skill in reducing or enlarging a drawing by the grid method.

PERFORMANCE GUIDES:

1. Read assignment on reducing or enlarging a drawing.
2. Observe a demonstration of reducing or enlarging a drawing.
3. Demonstrate ability to reduce or enlarge a drawing using a grid.

TASK # 5

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Measurement

TASK: Develop Skill in Measuring Using the SI Metric and English Standard Systems.

CRITERION REFERENCED MEASURE: Develop projects using both the SI Metric and English Standard systems of measurement.

PERFORMANCE GUIDES:

1. Measure various quantities of materials using both the Metric and English standard systems.
2. State the advantages of the metric system.
3. Learn the three main metric units - meter, liter, and gram.

TASK # 6

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Design

TASK: Develop Skills in Pattern Transfer.

CRITERION REFERENCED MEASURE: Demonstrate skills in transferring design patterns.

PERFORMANCE GUIDES:

1. Read assignment on transferring design patterns.
2. Observe a demonstration of transferring.
3. Demonstrate skills in pattern transfer using:
   a. Carbon paper
   b. Graphite

TASK # 7

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Laboratory Safety

TASK: Develop Safety Attitudes and Skills in Working with Industrial Crafts.

CRITERION REFERENCED MEASURE: Demonstrate good safety attitudes and skills in working with materials and equipment in an industrial crafts laboratory.

PERFORMANCE GUIDES:

1. Participate in class discussions on safety.
2. Follow established laboratory safety rules and practices.
3. Demonstrate correct usage of laboratory equipment.
4. Make a presentation to the class on an aspect of laboratory safety.
5. Design and make an appropriate laboratory safety poster.

TASK # 8

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Weaving

TASK: Develop Knowledge of Terms in Weaving.

CRITERION REFERENCED MEASURE: List and define the terms used in the craft of weaving.

PERFORMANCE GUIDES:

1. Identify and describe the following terms used in the craft of weaving:

a.	Batten	o.	Loom
b.	Beams	p.	Pick
c.	Border	q.	Ply
d.	Cross	r.	Repeat
e.	Dent	s.	Reed
f.	Drawing in	t.	Selvage
g.	Eye	u.	Skein
h.	Frame	v.	Sley
i.	Harness	w.	Spool rack
j.	Heddles	x.	Tabby
k.	Hook	y.	Temple
l.	Lambs	z.	Tension
m.	Lease sticks	aa.	Tie-up
n.	Lease pebs	bb.	Threading hook

TASK # 9

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Weaving

TASK: Develop Skills in Weaving on a Loom.

CRITERION REFERENCED MEASURE: Demonstrate skills in weaving on a simple loom.

PERFORMANCE GUIDES:

1. Read assignment on weaving with a simple loom.
2. Demonstrate skill in threading.
3. Demonstrate skill in the use of the frame.
4. Demonstrate skill in the use of the shed sticks.
5. Demonstrate skill in the use of the reed.
6. Demonstrate skill in the use of the shuttle.

TASK # 10

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Weaving

TASK: Develop Skills on Weaving on Frames.

CRITERION REFERENCED MEASURE: Demonstrate skills in weaving on frames or boards.

PERFORMANCE GUIDES:

1. Read assignment on weaving on frames.
2. Observe a demonstration of weaving on frames.
3. Demonstrate ability to weave on a frame.

TASK # 11

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Weaving

TASK: Develop Skills in Creating and Constructing a String Art Design.

CRITERION REFERENCED MEASURE: Demonstrate skills in design, creativity, nailing, and stringing in making a string art wall hanging.

PERFORMANCE GUIDES:

1. Read class assignment.
2. Observe class demonstration.
3. Demonstrate ability to design and produce a string art project.

TASK # 12

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Leathercraft

TASK: Develop a Knowledge of the Types of Leathercraft Products.

CRITERION REFERENCED MEASURE: Demonstrate knowledge of some of the many products that can be made in leathercraft.

PERFORMANCE GUIDES:

1. Read assignment concerning types of leathercraft.
2. Observe presentations of examples of leathercraft products.
3. List ten useful products that can be made in leathercraft.
4. Participate in class discussions.

TASK # 13

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Leathercrafts

TASK: Develop Knowledge of the Characteristics of Leather.

CRITERION REFERENCED MEASURE: Describe the characteristics of leathers including weights, workability, measurement, sources, and tanning.

PERFORMANCE GUIDES:

1. Read assignment on characteristics of leathers.
2. Take part in group discussions on the uses of leathers with different characteristics.
3. Explain how leather is tanned.
4. Identify the parts of a hide.
5. List the animal sources of various leathers.
6. Explain how leather is measured, bought, and sold.

TASK # 14

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Leathercraft

TASK: Develop Skills in the Use of Leathercraft Tools.

CRITERION REFERENCED MEASURE: Demonstrate skills with different tools used for work in leathercraft including draw-gauge knife, heavy-duty shears, skiving knife, drive punch, thronging chisel, modling tool, and tools used in embossing.

PERFORMANCE GUIDES:

1. Read assignment on leathercraft tools and their uses.
2. Observe demonstration of tools used in leathercraft.
3. Demonstrate ability to use:
   a. Draw-gauge knife
   b. Heavy-duty shears
   c. Skiving knife
   d. Drive punch
   e. Thronging chisel
   f. Modling tool
   g. Tools used in embossing.
   h. Swivel knife
   i. Stamping tools
4. Practice using leathercraft tools.

TASK # 15

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Leathercrafts

TASK: Develop Skills in Installing Fasteners.

CRITERION REFERENCED MEASURE: Demonstrate skills in installing eyelets, snaps, and rivets and in hand sewing and lacing.

PERFORMANCE GUIDES:

1. Read assignment on fasteners.
2. Demonstrate ability in setting:
   a. Eyelets
   b. Snaps
3. Demonstrate ability riveting.
4. Demonstrate ability handsewing.
5. Demonstrate ability with lacing.
6. Practice fastening leather.

TASK # 16

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Leathercraft

TASK: Develop Skills in Carving Leather.

CRITERION REFERENCED MEASURE: Demonstrate skill in carving a design in leather using a swivel knife and leathercraft tools.

PERFORMANCE GUIDES:

1. Read assignment on carving leather.
2. Observe demonstration of leather carving.
3. Practice carving leather.
4. Design a project incorporating carving leather.
5. Produce a product which involves leather carving.

TASK # 17

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Leathercraft

TASK: Develop Skills in Finishing Leather.

CRITERION REFERENCED MEASURE: Demonstrate procedures and skill in cleaning and finishing leather including staining, dying, painting, blocking, and buffing.

PERFORMANCE GUIDES:

1. Read assignment on cleaning and finishing leather.
2. Observe demonstration of cleaning and finishing leather.
3. Practice staining, dying and blocking leather.
4. Practice hand painting leather.
5. Practice finishing and buffing a leather product.
6. Demonstrate skill in finishing a leather product.

TASK # 18

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Wood Crafts

TASK: Develop Knowledge of Common Types of Wood.

CRITERION REFERENCED MEASURE: Identify and describe the following types of wood used most commonly in wood crafts: balsa, basswood, yellow poplar, pine, mahogany, black walnut, cherry, cedar, birch, redwood, white oak, fir plywood, and cypress.

PERFORMANCE GUIDES:

1. Read assignment on common types of wood.
2. Study examples of common types of wood.
3. Develop knowledge of common woods such as:
   a. Balsa
   b. Basswood
   c. Yellow poplar
   d. Pine
   e. Mahogany
   f. Black walnut
   g. Cherry
   h. Cedar
   i. Birch
   j. Redwood
   k. White oak
   l. Fir plywood
   m. Cypress
4. Write a report on a certain type of tree and its wood.

TASK # 19

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Wood Crafts

TASK: Develop Skills in Cutting Wood.

CRITERION REFERENCED MEASURE: Demonstrate skill in cutting wood with the coping saw, jig saw, hand saw, hand cross cut saw, hand rip saw, and back saw.

PERFORMANCE GUIDES:

1. Read assignment on cutting wood.
2. Demonstrate skills in cutting with the following types of saws:
   a. Coping saw
   b. Jig saw
   c. Hand saw
   d. Hand cross cut
   e. Hand rip saw
   f. Back saw
3. Practice using wood saws safely.

TASK # 20

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Wood Crafts

TASK: Develop Skills in Inlaying and/or Overlaying.

CRITERION REFERENCED MEASURE: Demonstrate skills in inlaying and/or overlaying in wood crafts.

PERFORMANCE GUIDES:

1. Read assignment on inlaying and overlaying.
2. Observe designs made by inlays or overlays.
3. Demonstrate ability in design making by overlaying or inlaying.

TASK # 21

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Wood Craft

TASK: Develop Skills in Laminating Wood.

CRITERION REFERENCED MEASURE: Demonstrate skills used to laminate woods.

PERFORMANCE GUIDES:

1. Read assignment on wood laminating.
2. Observe examples of lamination.
3. Observe class demonstration.
4. Practice laminating wood.
5. Produce a product utilizing lamination.

TASK # 22

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Wood Crafts

TASK: Develop Skills in Carving Wood.

CRITERION REFERENCED MEASURE: Demonstrate skills in scratch, chip, bas-relief and low-relief carving.

PERFORMANCE GUIDES:

1. Read assignment on Wood Carving.
2. Observe demonstrations in:
   a. Scratch carving,
   b. Chip carving,
   c. Bas-relief carving,
   d. Low-relief carving.
3. Produce a product involving carving.

TASK # 23

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Wood Crafts

TASK: Develop Skills in Wood Finishing.

CRITERION REFERENCED MEASURE: Demonstrate skills in wood finishing and list and describe common wood finishes.

PERFORMANCE GUIDES:

1. Read assignment on wood finishing.
2. Observe demonstration of wood finishing.
3. Demonstrate knowledge of types of finish.
4. Demonstrate skills in finishing using
   a. Brush
   b. Cloth pads
   c. Dipping
   d. Spraying

TASK # 24

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Ceramics

TASK: Develop Skills in Mixing and Wedging of Clay.

CRITERION REFERENCED MEASURE: Demonstrate skills in mixing and wedging clay.

PERFORMANCE GUIDES:

1. Read assignment on mixing and wedging of clay.
2. Observe mixing of clay.
3. Observe wedging of clay.
4. Demonstrate ability to mix clay in correct proportions.
5. Demonstrate ability to wedge clay using a wedging board.

TASK # 25

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Ceramics

TASK: Develop Skills in Slip Casting.

CRITERION REFERENCED MEASURE: Demonstrate skills in slip casting.

PERFORMANCE GUIDES:

1. Read assignment on slip casting.
2. Observe demonstration of slip casting.
3. Demonstrate ability to:
   a. Mix slip
   b. Pour slip
   c. Set molds
   d. Remove greenware from mold
   e. Dry greenware
   f. Clean greenware

TASK # 26

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Ceramics

TASK: Develop Skills in the Use of Clay Slabs.

CRITERION REFERENCED MEASURE: Demonstrate skill in slab building.

PERFORMANCE GUIDES:

1. Read assignment on clay slabs.
2. Observe demonstration in use of clay slabs.
3. Demonstrate ability to make projects using slab method involving:
   a. Rolling and cutting
   b. Laminating
   c. Shaping
   d. Drying
   e. Firing

TASK # 27

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Ceramics

TASK: Develop Skills in the Use of the Potters Wheel.

CRITERION REFERENCED MEASURE: Demonstrate skill in throwing and shaping on the potters wheel.

PERFORMANCE GUIDES:

1. Read assignment on potters wheel.
2. Observe demonstration in the use of the potters wheel.
3. Demonstrate skill in the use of the potters wheel involving:
   a. Throwing
   b. Shaping
4. Produce a project on the potters wheel.

TASK # 28

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Ceramics

TASK: Develop Skills in Finishing Ceramic Pieces.

CRITERION REFERENCED MEASURE: Demonstrate skills in the finishing of ceramic pieces including underglazing, glazing, staining, and hand painting.

PERFORMANCE GUIDES:

1. Read assignment on ceramic finishing.
2. Observe demonstration on finishing.
3. Demonstrate finishing with glazes, stains, and paints.
4. Observe firing in a kiln.
5. Identify the procedures in finishing ceramics.

TASK # 29

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Metal Craft

TASK: Develop Skills in Working with Metal Foil.

CRITERION REFERENCED MEASURE: Demonstrate skills in tooling and working with metal foil.

PERFORMANCE GUIDES:

1. Read assignment on metal foil.
2. Observe demonstration of decoration making with metal foil.
3. Practice tooling.
4. Demonstrate ability to emboss with metal foil using a mold.
5. Demonstrate ability to emboss with metal foil using the free form method.

TASK # 30

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Metal Craft

TASK: Develop Skill in Etching.

CRITERION REFERENCED MEASURE: Demonstrate skill in decorating or embellishing by etching.

PERFORMANCE GUIDES:

1. Read assignment on etching.
2. Observe demonstration on etching.
3. Develop skills using certain chemicals for etching.
4. Develop skills designing an etching.
5. Develop skills making an etching.

TASK # 31

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Metal Craft

TASK: Develop Skill in Enameling.

CRITERION REFERENCED MEASURE: Demonstrate skill in enameling with different types of metal.

PERFORMANCE GUIDES:

1. Read assignment on enameling.
2. Observe a demonstration of enameling.
3. Demonstrate ability in enameling using types of enamel and a kiln or bunsen burner.